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Editorial

The Port of Havre.

The Port of Havre, which was first founded in 1517, is to-day one of the principal ports in France, and new works are continually being carried out so that the port can cope with the ever-increasing demands made upon it by shipping. The latest developments which are to be undertaken to increase the facilities for shipping at the Port of Havre are as follows:—

(a) Dredging the approach channel to give a depth of 10.8 metres (35½-ft.); widening the harbour entrance to 200 metres (about 650-ft.) by moving the South breakwater; and the protection of the roadstead by new breakwaters, so as to create a sheltered water area for shipping at anchor; and for large hydroplanes. This latter work will be carried out at a later date.

(b) The formation of new quays, erection of sheds, and increasing the present repairing facilities; the improvement of the docks and of their particular equipment.

(c) The canal between Havre and Tancarville to be brought up to the standard required for sea-going ships, so that industrial zones can be established on the banks of the canal and thus receive their raw materials direct from vessels from abroad.

The continual improvements at the Port of Havre have brought their reward, as regards the volume of shipping entering and leaving the port, the figures for 1932 being about 20,000,000 nett registered tons, this being an improvement upon 1931, and also practically double the volume of shipping entering and leaving the port in 1918.

The Port of Havre is exceedingly well planned as regards accommodation, and at the present time includes two outer harbours, an inner harbour, ten wet docks and a large tidal basin. The tidal basin, which is accessible at all states of the tide without locking, is utilised for the large trans-Atlantic liners, and on the north side of this basin there is a quay more than 2 kilometres (about 1¼ miles) in length, which is used for berthing the ships. On the south side along the South Breakwater special docks have been constructed for the reception of oil tankers whose cargoes are discharged into 33 shore tanks, which have a total capacity of 125,000 cubic metres or 25 million gallons.

The dry docking accommodation in the port comprises seven graving docks, one of which is 313 metres (1,025-ft.) in length by 38 metres (125-ft.) in width. There is also a 3,500-ton floating dock with two pontoons, and a recent addition to the facilities at the port is a large floating dock of 16,500-ton lifting capacity, which is equipped with the most up-to-date mechanical improvements.

The mechanical-handling plant comprises 240 machines, both ashore and afloat, and their capacity ranges between 1½ and 200 tons, most of them being electrically driven. The shed accommodation on the quays enables passengers to pass from ship to rail or vice versa, under cover all the way, and two new sheds are now under construction, one of which, when completed, will measure 600 metres (1,970-ft.) long by 40 metres (130-ft.) wide, and will be able to accommodate, at one time, two of the largest liners in the world.

An illustrated article on the Port of Havre appears on another page in this issue, and also forms the supplement for this month.

King George V. Graving Dock, Southampton.

On Friday, January 19th, 1934, the King George V. Graving Dock at Southampton, the largest graving dock in the world, was first used for commercial purposes by the White Star Liner "Majestic," and the operation of docking this vessel was carried through without a hitch.

The "Majestic," which is a vessel of 56,621 tons, with a length of 915.5-ft. and a beam of 100.1-ft., is by no means the largest vessel which this graving dock can accommodate, as the dimensions of the graving dock are 1,200-ft. in length, with a width at entrance and between buttresses of 135-ft., and the dock is capable of accommodating a vessel of 100,000 tons.

After the "Majestic" had entered the dock, the dock gate was closed, and four 54-in. electrically-operated centrifugal pumps commenced working upon the task of emptying the dock of about a quarter of a million tons of water, and this operation was accomplished in four hours.

Clyde Navigation Trust: Increase in Revenue.

At a recent meeting of the Clyde Navigation Trustees, Mr. W. F. Robertson, who presided, gave out some interesting figures, which were an indication of better times. The figures given to the meeting show that the Clyde Trust revenue for the second six months of 1933 reached £374,000, as compared with £357,000 for the corresponding period of 1932.

The figures given as regards traffic would have been even better but for the fact that the graving docks had not been used to such a great extent as formerly, and there was therefore a decrease under that heading of £7,500, but under the other headings traffic had increased by £25,000, which left a nett figure of £17,500 after taking off the loss at the graving docks.

There was an increase of approximately £3,000 from dues on vessels, cargo dues showed an increase of £13,000 to £14,000, the revenue at the granary was up by £3,000, whilst the increase derived from the utilisation of cranes, capstans and weighing machines was about £3,800, and the revenue from ferries at Renfrew and Erskine had increased by about £700. Altogether, the figures were very satisfactory and are a good omen for the new year.

Regarding work at the harbour, every reasonable economy had been given effect to, and no new work had been started. The work at the present time in hand at the General Terminus Quay, which is expected to be completed within a month or two, will mean that something like three-quarters of a mile of quayage will have been renewed on the south side of the river in the middle of the harbour, and will thus ensure the Clyde Trust being in a position to cope with any increase in trade which may ensue when the boom in trade commences.

Preston Dock.

During the eight months ending November, there was greater activity at Preston Dock than for a long time. Mr. J. G. Merriweather, the traffic manager at the dock, states there has been an increase in the revenue at the dock, for the eight months ended November, of £18,467. Imports had increased by 70,898 tons, but there had been a decrease in exports of 4,159 tons. This has been entirely due to the Irish situation which developed during the year. The items which made up the increase were:—Wood pulp, 12,499 tons; timber, 37,588 tons; motor spirit, 8,648 tons; china clay, 1,021 tons; cement, 1,915 tons; and slates, 6,374 tons.

The Institution of Mechanical Engineers.

The Institution of Mechanical Engineers, which has not held its annual summer meeting in Liverpool since 1909, intends to hold its annual conference here from June 25th to 29th. The Institution, which was founded in 1847 under the presidency of George Stephenson, and now has over 11,000 members all over the world, holds its meeting in the area from which its president is drawn, and this month Mr. Charles Day, chairman of Messrs. Mirrless, Bickerton and Day, of Stockport, will be elected president.

North-East Coast Notes

TRADE on the North-East Coast concluded 1933 on a distinctly optimistic note, and the present years seems reasonably full of promise of an improvement all round. Last year's shipbuilding record in the area was deplorable, but already there are orders booked which guarantee more activity in the ship yards in the coming months. Ship repairing also has been busier recently and as the tonnage in commission increases, this should be better still. The coal trade had indicated improvement for some time before the end of the year, and the final figures gave little cause for surprise. On the Tyne it had been hoped that the shipments would touch 13,000,000 tons, but this expectation was not realised, the total of 12,943,049 tons comparing with 12,776,273 tons in 1932, being an increase of 166,776 tons. Blyth, however, put up a new record at 5,771,632 tons, an increase of 841,018 tons on the previous year, and a quarter-of-a-million tons above the previous record of 1929.

Regarding the Tyne shipments it was reported to the Tyne Improvement Commission at their December meeting that an interesting feature of the shipments in November was that the increase was nearly half of the total increase for the previous eleven months. In November, the total shipped was 1,287,055 tons, compared with 1,185,114 tons in November, 1932, an increase of 101,941 tons. For some time past the coke loadings from the Tyne had been on an ascending curve, and in November they totalled 107,879 tons against 92,521 tons in November, 1932, an increase of 15,358 tons.

New Tyne Officials.

On the retirement of Capt. T. L. S. Garrett, Assistant Harbour Master, the Tyne Improvement Commission have appointed Capt. P. S. Peat as Deputy Harbour Master. Mr. C. W. Blaylock, Dockmaster's Assistant at the Commissioner's Northumberland and Albert Edward Docks, has been appointed Assistant Harbour Master, to fill the vacancy caused by the promotion of Capt. Peat.

Sir Arthur M. Sutherland, Bart., chairman of the Newcastle Commercial Exchange, has been presented with a commemorative parchment to mark his 50 years' business associations with Newcastle Quayside.

Tyne-Baltic Service.

The extension of the Newcastle Corporation Quay, opened by the President of the Board of Trade, has facilitated the berthing of, and the handling of cargo from, big vessels, and at the same time has permitted the ordinary weekly shipping traffic to be carried on without the congestion which sometimes prevailed with the arrival of large vessels.

The sailing of the "Baltara" from the Tyne in the early days of January for the Baltic began another stage in the progress of the shipping trade. It commenced a regular weekly mail cargo and passenger service between the Tyne and the Baltic Ports which the United Baltic Corporation, Ltd., of London, decided to establish as an extension to their existing London-Baltic services. The weekly London service will run via the Tyne to Danzig, Gdynia and other of the Baltic ports open at this time of the year.

A loading record was created in the Tyne on the last Saturday of 1933, when the 6,391 tons steamer "Rajahstan" shipped 1,700 tons of bunkers in five-and-a-half hours. The vessel entered the river at 2.45 p.m. and berthed at the Tyne Commissioner's Berths at 3.15 p.m. Bunkering was completed at 8.45 p.m.

At the December meeting of the Blyth Harbour Commission Mr. Ridley Warham referred sympathetically to the death of Mr. J. W. Witherington. Mr. Warham also welcomed Mr. A. S. Witherington, who had been elected by the shipowners to fill the vacancy caused by the death of his father.

Review of Wear Developments.

Mr. J. E. Dawson, the Chairman of the River Wear Commission, at a meeting of the Board at the end of 1933, reviewed the position of the trade and the works of the Commission. He said the year just ended had been an unsatisfactory period for the port. The great depression in commerce throughout the world had persisted, and everything was still in a most disturbed condition which was quite inimical to profitable trading. They had been subjected to the great unfairness of having a surcharge of 1½d. per ton put upon the Wear coal shipments by the Durham Executive Board operating under the Coal Mines Act, which seriously affected shipment tonnage. They vigorously combatted that imposition, which, after tedious and prolonged negotiations, had at last been removed. In the circumstances which he had recounted, it was not surprising that they were compelled to ask the Corporation to advance them £35,000 to meet the deficiency in the revenue for the year.

"In view of certain criticisms made publicly," he added, "it seems necessary for me to say that this is a loan and not a

gift. It is obtained under the financial arrangements made some years ago between ourselves and the Corporation for the general welfare of the town and port. I ought, perhaps, to tell you in detail how these finances have operated since their inception. They commenced in 1922 when we borrowed £250,000 from the Corporation. In the year of the great coal strike we received two further loans—£38,000 to meet the revenue deficiency, and £25,000 for capital expenditure. In the year following a further £15,000 was advanced for capital works. Last year, owing to the persistence of the trade slump, we received another sum of £40,000 to meet revenue deficiency, and this year £35,000 has become also on revenue account. These advances aggregate to £403,000. On the other hand these loans have been the subject of regular annual payments, and, in addition, other repayments have been made, the sum total of all of which has resulted in a return of £257,000, in addition to which there is another £4,000 due in January next. To-day we owe the Corporation £145,800 which will be liquidated as we go along. All the time these sums have carried interest of 5 per cent. per annum, which, especially to-day, is a very desirable rate of interest, particularly as it is accommodation for mutual benefit. You will be interested to know that so far we have paid to the Corporation in interest on these loans £117,077, so that in all the circumstances it has been a good deal for them."

Despite poor trade, he added, it would interest them to recall what had been done within the port during the past 20 years, in an endeavour to keep abreast of the times. The improvements made and their cost are shown in the following table:—

	£
Nos. 1 and 2 Coal Belt Conveyors	67,343
Grain Suction Plant and Storing Equipment	19,232
New Sea Wall and Wave Basin (Harbour Entrance)	45,665
Purchase, Excavation and Extension of Barracks Site	35,662
Removal of Tide Gauge Jetty	33,111
No. 23 Coal Staith	110,733
New Grab Dredger and Hoppers	39,000
Special Deepening of Dock and River Channels	18,000
No. 8 Coal Staith	10,850
Additional Electrical Equipment	47,000
Total	£426,596

Though they had thus incurred capital outlays of nearly £430,000, their borrowed monies (which represented their capital), by operations of sinking funds and loan repayments, had only increased by £165,170.

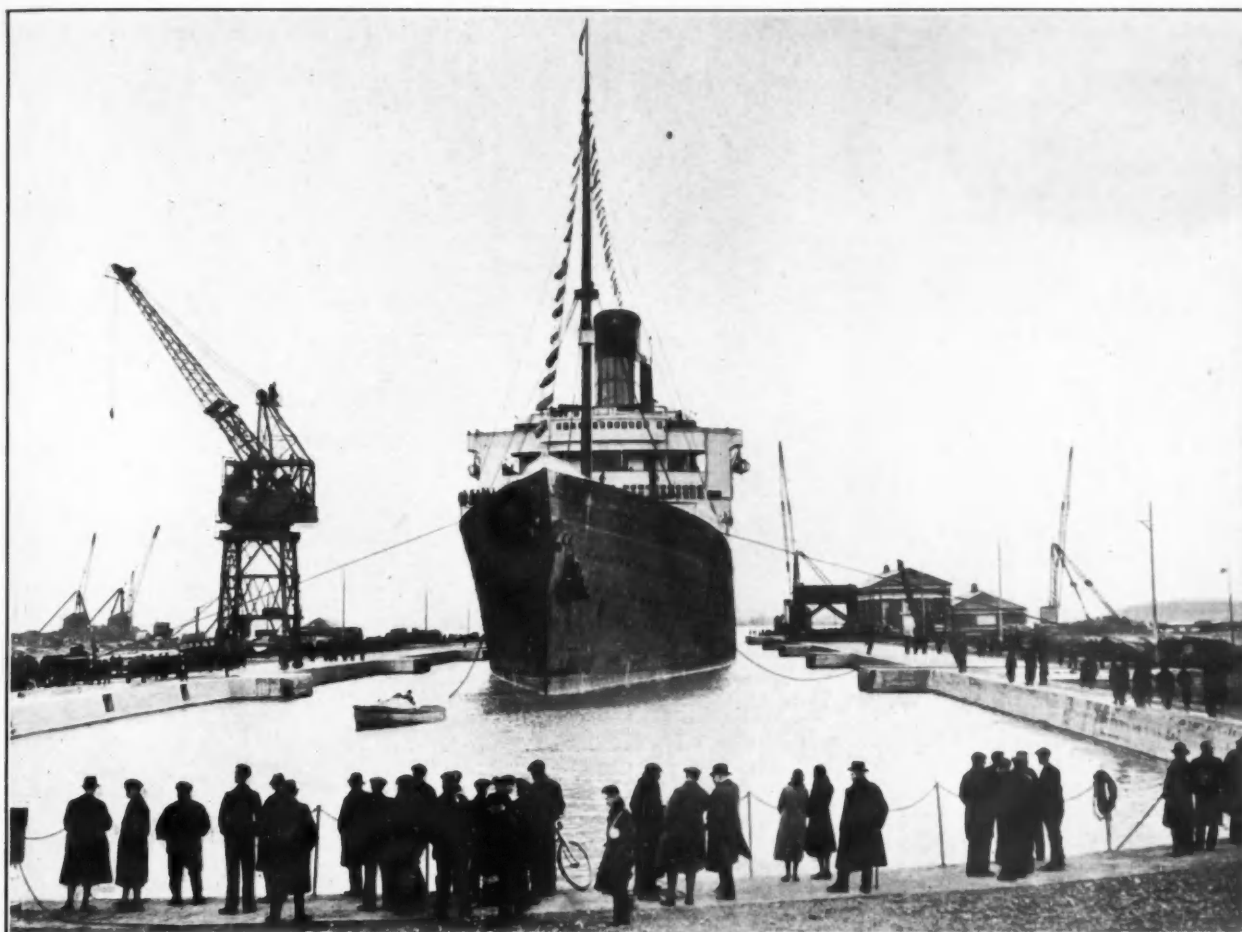
Tees and Hartlepoons.

Statistics from the Tees and Hartlepoons areas are generally satisfactory in character. The iron and steel shipments from the Tees in December totalled 43,725 tons, an increase of about 7,000 tons. The returns of pig iron shipments were the highest for the past three years. The trade report from the Hartlepoons for 1933 is very similar to that for the previous year. The coal and coke shipments at 3,187,119 tons were 19,978 tons higher than in the preceding year and other goods at 10,496 tons were about 1,000 tons up. In the imports there was a decrease of 6,842 tons, the total being 350,000. There was a fall in timber of 13,400 tons, but on the other hand there was an increase of 4,440 tons in ore.

Successful Year at the Port of Bristol

The figures relating to the trade of the Port of Bristol for the year just closed reveal steady progress, compared with the previous twelve months. Both the register tonnage entering the port, and the total quantity of goods discharged, show encouraging increases. In the case of the register tonnage there is an increase of 87,000, while the imports have gone ahead to the extent of 115,000 tons. The commodities principally responsible for this increase are grain, petroleum, tobacco, provisions and wood goods. In the case of grain, of which something like one million tons per annum is handled at Avonmouth, last year's figures were 78,000 tons in advance of 1932. The larger and more frequent shipments of dairy produce from New Zealand are reflected in the increase in tonnage of provisions. The quantities of petroleum and petroleum spirit shipped to Avonmouth are also very well maintained, and the increase recorded in the past year's figures is likely to be still further advanced during the coming year, as a result of the establishment of new installations at Avonmouth. It is interesting to recall that a sum of £25,000,000 is paid as duty each year on tobacco imported into Bristol. This colossal amount will be somewhat higher this year by reason of an appreciable increase in the imports of tobacco.

The Port of Southampton



The "Majestic" in the King George V. Graving Dock, Southampton, on January 19th, 1934.

Southampton's Statistics for 1933 show Distinct Improvement over 1932.

THE year 1933 was memorable for Southampton, not only because it marked the opening by H.M. the King of the giant new graving dock and the completion of further stages of the dock's extension scheme, but because, in this period of trade depression, there was a considerable increase in the total tonnage entering or leaving the port and increased use of the docks by foreign vessels.

The year's figures are a distinct improvement on those for 1932 in practically every department, but the gross tonnage figures show an increase of about 2,500,000 tons, both inward and outward, and in the net tonnage figures there is an advance of about 1,250,000 tons in each direction. The amount of tonnage entering the port was only a little over 1,000,000 tons below the record figure established in 1930.

The increase in the tonnage totals is largely attributable to the reduced docking charge of 1½d. per net registered ton which was introduced by the Southern Railway Company in the spring for vessels coming to a berth on the docks instead of embarking or disembarking passengers in Cowes Roads or off Fawley.

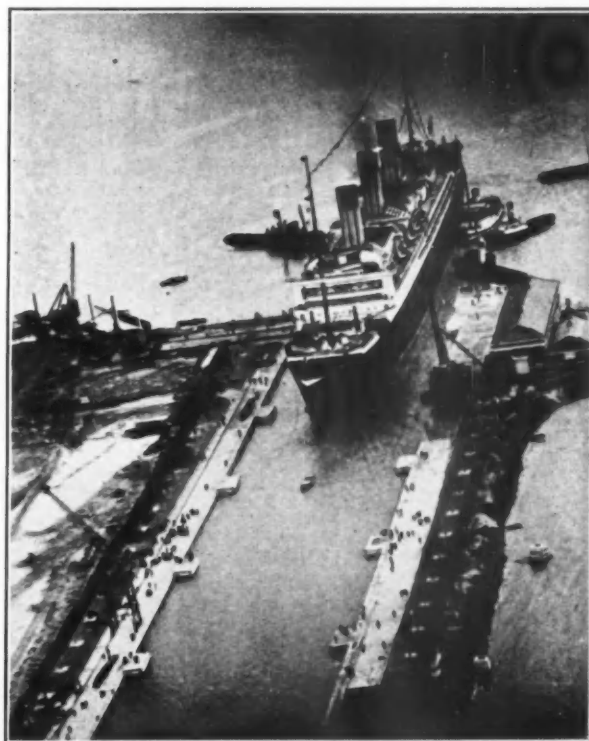
The move was made by the Company in the hope of inducing more vessels to use the docks, and the enterprise has met with reward, for since the new rate was introduced the largest vessels of the North German Lloyd, Hamburg-America Line, and United States Lines have come to a berth when westbound from European ports to the United States. Similarly, a number of the Rotterdam Lloyd liners have been attracted to the docks to land passengers on their homeward-bound voyages from Batavia.

The volume of cargo handled during 1933 was in excess of the 1932 total. Imports show a small decrease of a few thousand tons, but exports show an increase of about 25,000 tons. The balance on the right side is particularly gratifying, in view of the efforts that have been made in recent years to improve Southampton's position as a cargo port.

There were decreases in the imports of raw wool, timber and grain, but there was a striking development in certain sections of the fruit trade. During the deciduous fruit season over 3,000,000 packages of such fruit were received from South Africa, an increase of over three-quarters of a million packages, compared with 1932. There was also a great growth in the

banana trade from the West Indies and Central America. This trade was quite small in 1931, but it has grown to such an extent that more than a million bunches of bananas were handled at the port during 1933.

But while the cargo returns are important, it is to the passenger traffic that Southampton looks most, and it is pleasing to find that the previous year's figures were eclipsed, both as



Aerial View of the "Majestic" entering the King George V. Graving Dock at Southampton, on Friday, January 19th, 1934.

Port of Southampton Topics—continued

regards inward and outward-bound passengers by comfortable margins. The increase inward amounted to about 2,000 travellers, and outward to about 3,000. Southampton can claim, therefore, to have retained the cherished title of premier passenger port in the United Kingdom. The popularity of cruising on ocean liners was, of course, a feature of the activity of the port during 1933.

The completion of sections of the dock's extension made an extra 3,000-ft. of quays available. The first two berths of the new quay have been in use almost continuously during the year, while excellent progress has been made with the erection of the sheds and other buildings on the quayside.

In May the second section of passenger and cargo sheds will be ready for use, and in June the first factory to be erected on the reclaimed land, the flour mill of Messrs. Joseph Rank, Ltd., will be ready for opening. This great mill, which will be a landmark on Southampton's sky-line, will deal with thousands of tons of grain, and as a consequence will draw extra ships to the port.

King George V. Graving Dock used for the first time by the "Majestic."

King George V. graving dock at the western extremity of Southampton's great new docks, was used for the first time on January 19th, when the world's largest liner, the White Star liner "Majestic" (56,621 tons) was successfully dry-docked, so that the under-water portion of her overhaul might be carried out. It was a unique occasion, for it was the case of the world's largest steamship using the world's largest graving dock.

The dock, built at a cost of £1,850,000, and forming an important part of the extension scheme, was opened by the King on July 26th, when he and other members of the Royal family sailed into the dock in the yacht Victoria and Albert. Since then a great deal of work has been done at the dock, and its success was shown by the ease with which the delicate operation of docking such a ship as the "Majestic" was carried out.

The "Majestic," which had been lying at Berth 102, one of the berths of the extension scheme, was gaily dressed overall with bunting, and was moved from the berth to the new dock by tugs. The actual docking operation took less than an hour. She entered inch by inch, the greatest care being taken in view of the occasion. Immediately the ship was in position the great caisson, which closes the dock, was hauled across the entrance, and in a matter of minutes the pumping out of the water began.

The special caisson haulage gear, which was constructed by Messrs. Stothert and Pitt, Ltd., of Bath, worked very satisfactorily.

The dock was pumped dry in four hours, as expected, an excellent performance considering that the pumps were stopped periodically to enable scrubbing-down operations to be carried out on the hull of the ship.

Filled to the level of high water ordinary spring tides, the graving dock holds 263,000 tons of water. The emptying operation is carried out by 16 pumps of varying sizes, but the four main pumps, each of 1,250 horse power, have 60-in. suction and 54-in. discharges.

Despite her bulk, the "Majestic" does not nearly fill the dock. She is 915.5-ft. in length and 100.1-ft. in beam. The graving dock is 1,200-ft. long and 135-ft. wide at the entrance. Built primarily for the new Cunarder, the dock will accommodate a vessel of 100,000 tons, should such a monster be constructed.

An area in front of the dock has been dredged to a depth of 29-ft. L.W.O.S.T., which will give a depth of 42-ft. at high water. Later, this area will be deepened so as to conform to the remainder of the deep-water channel, which has been dredged to a depth of 35-ft. L.W.O.S.T.

Improvement to Southampton Dock Approaches.

The Southampton Harbour Board have decided to improve the approaches to the docks, and for this purpose an expenditure of £34,799 will be necessary, and will be additional to the contract for £240,000 which the James Dredging, Towage and Transport Co., Ltd., are already carrying out at Southampton.

The work comprised in this new contract will include a further improvement near Fawley, which will thereby straighten out the channel at one of its narrowest points. The length of the area to be dredged is approximately 8,000-ft., and the width, at the widest point, which is at Fawley Beacon, is 500-ft., narrowing to 200-ft. at Dean's Elbow Buoy. The Board also propose to dredge an area off Fawley Jetty.

When the amended contract is completed the deep-water approach channel from West Bramble to Fawley Beacon will have a minimum depth of 38-ft. and a width varying from 1,000-ft. to 2,000-ft. from Fawley Beacon to Dean's Lake Buoy. There will be a width of 1,000-ft. and a depth of 35-ft. between Dean's Lake Buoy and North-West Netley Buoy. The channel will be 700-ft. wide and 35-ft. deep, and will then widen out to 1,200-ft. to the docks.

Scottish Harbour Notes

Loan Sanctioned for Work at Stornoway.

Great satisfaction is felt in Stornoway at the announcement that the Public Works Loan Board has sanctioned a loan of £23,000 to the Stornoway Pier and Harbour Commissioners for the reconstruction of the principal wharf of the harbour. The reconstruction of this wharf is the third instalment of an ambitious scheme commenced by the Commissioners several years ago. Already the Cromwell Street Quay, North Beach Quay, and Esplanade Quay have been entirely reconstructed in reinforced concrete, and a large area of the harbour deepened by dredging. When the new scheme is completed Stornoway will have one of the finest harbours for fishing vessels in the country, and will also be able to accommodate at the quays vessels of very considerable tonnage and draft.

Lerwick Harbour Trustees and Sinking Fund.

Question of the failure of Lerwick Harbour Trustees to have a sinking fund was raised at a recent meeting of the Finance Committee, when it was stated that such a fund should have been provided under terms of the Lerwick Harbour Improvement Act, 1877, which lays down that a sum of not less than two per cent. of money borrowed must be applied annually towards such a fund. It was stated at the meeting that in 1892 a fund was inaugurated; but that in 1916, because of financial difficulties, the money was realised to meet commitments to the Public Works Loan Board. Ultimately, it was moved that £5,000 invested in Conversion Loan be transferred to a sinking fund, and, as an amendment, it was moved that only £4,000 be transferred, the remaining £1,000 to be held in reserve. The amendment was ruled incompetent on the ground that it failed to comply with the terms of the Act. After discussion the Chairman stated that a deadlock existed, and that he intended writing the Public Works Loan Board on the matter.

Aberdeen Harbour Statistics.

Interesting statistics as to imports and exports are contained in the newly-issued annual accounts of the Aberdeen Harbour Commissioners indicating that the total ordinary revenue for the year ending September last amounted to £141,241 and the total

ordinary expenditure to £106,479. Compared with the previous year, the ordinary revenue shows a decrease of £4,179, and the principal decreases were:—Rates for goods imported (£2,158) and salmon fishings (£4,153); while the principal increases were goods exported, £936; rates for pontoon dock No. 3, £492; and rents of ground, £510. The total ordinary expenditure also shows a decrease of £13,077. The principal increases were:—Roads on inches and quays, £566; dock walls and wharves, £1,626; North Pier, £1,049; and sheds, £509; while there were decreases on taxes and public burdens, £7,556; rock-cutter barge, £1,131; dredging (maintenance), £1,935; pontoon dock No. 3, £2,003; quay rails, £2,302; salmon fishings, £657; and interest, £789.

Lecture on Salvage Operations in the River Mersey.

Captain F. W. Mace, who is Marine Surveyor and Water Bailiff for the Mersey Docks and Harbour Board and in this capacity responsible for the salvage work in the Port of Liverpool, recently gave a lecture on "Salvage Operations in the River Mersey."

Captain Mace pointed out that the Mersey Estuary has a bed which is largely composed of shifting sand and is therefore not too good for salvage operations. In the case of a sinking ship speed is an essential factor in salvage work, as a vessel has been known to sink in the sand at the rate of 12-ft. the first day and a further 6-ft. on the second day.

Regarding the financial side of Mersey Salvage, Captain Mace explained that by virtue of their Acts of Parliament the Harbour Board do not work for a profit, and all they can take out of the proceeds of a wrecking operation is the cost of their services. Should there be insufficient proceeds, there is, however, no claim on owners for the cost of removal of the wreck, as there is in many other British ports. Included in the harbour dues is a Conservancy rate on every vessel entering the port and the fund of this Conservancy rate maintains the salvage plant, etc., and at the same time spreads the costs of salvage over the whole body of shipowners using the Port of Liverpool.

Notes from the North

Ellesmere Port Lay-Bye Accident.

WHILE constructing a new dock lay-bye at the Bowater Paper Mills, Ellesmere Port, an accident occurred which resulted in the death of one man and injuries to three others. Sir Robert McAlpine & Sons are the contractors for the job. It appears that a number of men were working in the bottom of the excavations, scattered at different points. Four men using pneumatic drills, breaking into solid masses of rock, were together at the foot of the face of a wall of rock and sandstone 30-ft. high. As it proved, they were the only ones working in what proved to be the "danger zone." A rumbling noise indicated that something was wrong, but this was not apparent to the unfortunate men, whose drilling machines were making a loud noise. Suddenly the solid wall of rock, stone and earth, estimated to weigh over 300 tons, collapsed for the whole length of one side and the men were buried alive. An alarm was at once raised and those working in the bottom of the dock hurried to the spot and began clearing away the debris from the vicinity where they knew the men had been working. They were reinforced by other workmen, including the night shift, who had assembled to take over from the day shift. In addition to the large gang of rescue workers, cranes were brought into use to remove huge obstacles of rock and sandstone which could not be handled by the men. The work of rescue proved timely, the whereabouts of the men being indicated by their shouts for help.

New Traffic at Gladstone Dock.

History was made at Gladstone Dock, Liverpool, on the 18th January, when 25,000 gallons of latex (milk of the rubber tree) was discharged from the Blue Funnel liner "Eumaeus" into two storage tanks, each with a capacity of 25,000 gallons, which have been erected at the dock.

Hitherto rubber latex has been brought into Liverpool in small steel drums. The liquid rubber, of the consistency of cream, was pumped from the two tanks aboard the steamer into one of the storage tanks in about two hours. The latex will be conveyed in small tanks, each holding 500 gallons, to the works at Walton, Liverpool.

Dock Board Pilotage Service.

Liverpool Steam Ship Owners' Association, the Liverpool Ship Owners' Association, the Manchester Steam Ship Owners' Association, and the Chamber of Shipping of the United Kingdom, have made application to the Board of Trade for an order to amend the limits of the Liverpool pilotage district to provide for the abolition of the Point Lynas Station.

The Mersey Docks and Harbour Board on several occasions has been asked to consider the matter. The abolition of the station would mean a substantial saving in the costs of the pilotage service estimated eventually at approximately £17,000 a year. Outward pilotage ends at the Bar, and it is only inwards that pilotage from Point Lynas is obligatory. Navigation from Point Lynas to the Bar is unattended by any difficulty, and is only the question of congestion and difficulty on arrival at the Bar, and in the boarding of a pilot there, which has caused the associations' concern.

New Ship Canal Factory.

Lobitos Oilfields, Ltd., have begun the erection of their new crude oil refinery near the Stanlow Oil Docks on the Manchester Ship Canal. About 50,000 tons of crude oil from the company's Peruvian fields will be handled there annually.

New Wharf at Ellesmere Port.

A new wharf is being constructed at Ellesmere Port for Bowater's Paper Mills. It will be 1,100 feet long and there will be 30-ft. of water alongside, so that ocean-going vessels can bring wood-pulp direct to the mills.

Better Facilities at Whitehaven.

Representatives of the Whitehaven Harbour Board, Priestman Whitehaven Collieries, Ltd., Whitehaven Town Council, and Whitehaven Rural District Council, have formed themselves into a committee to support, as far as possible, a scheme to be put forward by the Harbour Commissioners for improving shipping facilities at the port. The committee intend to co-opt other industrial interests. The committee's object will be to press upon the appropriate Government department the desirability of supporting the scheme of the Harbour Commissioners, which, as being associated with the projected colliery developments, is one which is likely not only to relieve the immediate distress, but to provide permanent employment for a large number of men.

Dee Estuary Scheme—Finis.

It is not likely that any more will be heard of the scheme for constructing a road and railway bridge over the Dee estuary. At Flintshire County Council, the local authorities affected by the proposal asked the County Council to proceed, but a resolution was passed, declaring that "no such thing is now under consideration." The undertaking, which is estimated to cost a cool ten millions sterling, envisaged an embankment from somewhere near the Point of Air, with a bridge to the north side of the estuary near Hilbre Island. The main justification for this ambitious venture was to afford shorter communication between Liverpool and the North Wales coast.

Llandudno Sea Defences.

Llandudno Council has been giving attention to the question of erecting sea defence works on the North Shore. The Surveyor (Mr. W. T. Ward) has prepared a scheme, of which the following is an outline:—

Mr. Ward has drawn up a report, observations, detail plans and sections on the subject of coast erosion and sea defence works in Llandudno Bay and flood prevention proposals.

The scheme recommended comprises the following works:— (a) certain works of a preliminary character; (b) construction of 80 groyne between Lloyd Street and Neville Crescent; (c) construction of six groyne between Neville Crescent and Queen's Road; (d) additional concrete steps between Arcadia and Queen's Road; (e) concrete platform and sea bench between the Pier Gates and the east end of the promenade retaining wall; (f) flood prevention works along the edge of the promenade grass plots; (g) cliff protection work below the Happy Valley.

With regard to item (f), the Surveyor was asked to consider a modification of the proposal to provide a dwarf concrete wall in the form of continuous seating. After the Surveyor had further explained his proposals, the Council decided to adopt the recommendations contained in the report, subject to further consideration of the suggested modification of the proposal relating to the dwarf sea wall and to the submission of an amended estimated cost in respect of that part of the scheme.

Profit from Foreshore Gravel.

During the past half-year, Fleetwood Corporation has made a profit of £3,826 from the sale of gravel from the foreshore. The Corporation used 1,366 tons (chiefly for cement), while 16,744 tons were sold to builders. The total amount realised from the sale of gravel and sand was £5,849, while the expense of collecting it from the beach was £2,023, of which £1,235 was paid in wages.

Other undertakings of the Corporation have also proved remunerative. The ferry steamer service across the River Wyre between Fleetwood and Knott End shows a net profit of £2,024, which is £740 more than in the corresponding period of last year. About 430,000 passengers were carried, and after the winter's working, which is not run at a profit, it is probable that about £1,000 will be available for the relief of the rates.

Dock Railway Improvement.

In order to relieve dock police of the duty of "watching" Huskisson Dock Station (Liverpool Overhead Railway) entrance from the dock, a bridge is being constructed over the line, with a stairway down to the Dock Road. The work is being undertaken at the request of the Mersey Docks and Harbour Board. When the work is completed there will be no entrance to the station from the Dock Estate. Passengers from the Liverpool side alighting at the station will cross the bridge and come out on to the Dock Road without entering the Dock Estate. The Alexandra Dock Station was the first to be treated in this way, and Gladstone Dock Station, which has two bridges, was so constructed in the first instance.

Pwllheli Harbour.

Pwllheli Council has received a report by Mr. Ralph Freeman, of the firm of Sir Douglas Fox and Partners, following on his recent inspection of the harbour. A Council committee which has had this report under consideration has expressed regret that the suggestions which had been made for enclosing a part of the harbour were quite prohibitive on the ground of expense. At the same time they would like the Council's thanks to be conveyed to Mr. Freeman for his kindness in the matter.

New Ferry Bridge.

The Wallasey Ferries Committee has accepted a tender of £6,462, for the removal of the existing steel bridge between New Brighton Pier and the Landing Stage and the provision of a new bridge.

Notes from the North—continued

Dock Board and Reporting of Shipping.

Some of the commercial interests of the Port of Liverpool criticise the Mersey Docks and Harbour Board because of the charges it makes for reporting inward-bound steamers as they approach the Formby Lightship. At a recent meeting of the Liverpool Chamber of Commerce it was pointed out that there was a good deal of difference between conditions at Southampton and Liverpool. At Southampton the authorities freely gave information of ships approaching the port, whilst at Liverpool the fee for such information was about 10s. a time. Members stated that representations should be made to the Mersey Docks and Harbour Board to give facilities likely to be of value to the importing interests.

Henry Simon, Ltd.

Sir E. D. Simon has resigned from the chairmanship of Henry Simon Ltd., the Cheadle Heath (Manchester) engineers, in order to give more of his time to public work. It is understood that Sir Ernest will continue in the chairmanship of Simon-Carves, Ltd., engineers, also of Cheadle Heath. His successor in the chair of Henry Simon, Ltd., will be Mr. Cecil Bentham, who has been managing director since 1926.

In 1901 Mr. Bentham joined the firm as a draughtsman in the conveying department. He became manager of that department in 1911, and a director of the firm in 1916. During the war he was consulted by both the British and the French Governments on matters connected with the handling of grain and other goods. Mr. Bentham has just been elected vice-president of the Manchester Engineering Employers' Association, and is a member of the councils of the Institute of Mechanical Engineers and the British Engineers' Association.

Birkenhead Ferry.

Birkenhead Ferries Committee has under consideration the reconstruction of the ferries premises at Woodside. Nothing will be done, however, without consulting the Mersey Tunnel Committee.

Personal.

Mr. Oswald William Young, who was formerly rating surveyor to the Mersey Docks and Harbour Board, died at London recently at the age of 82. Mr. Young was appointed to the position on the Board in 1873. He was principal of the estate and rating department from 1883 to 1916, when he retired. He then acted in a consultative capacity as rating and income tax surveyor to the Board until 1931. Mr. Young was at one time regarded as one of the foremost experts in rating matters in the North.

Dredging near Liverpool Landing Stage.

One of the Mersey Docks and Harbour Board's dredgers recently operated at the berth of the Rock Ferry steamer at the Liverpool landing stage. It was used in connection with sluicing operations taking place behind the landing stage to clear away the slimy mud that accumulates there. As the mud was sluiced away, the dredgers proceeded to clear the river about the landing stage. This sluicing has to be carried out from time to time, but usually the dredger works at the end of the stage, near the old Eastham Ferry berth, without interfering with the Rock Ferry berth.

Exceptional Traffic at Gladstone Dock.

There was loaded at Gladstone Dock, Liverpool, recently, a cargo of railway engines and carriages for Sao Paulo, Brazil. There were six locomotives, each weighing 60 tons; eight composite carriages, and eight vans, some of which weighed 31 tons 18 cwt. each. The vessel on which this cargo was carried is specially designed for the transport of heavy railway rolling-stock. All the lifting of the engines and coaches was done by the ship's own gear. The locomotives were stowed in the holds, and the carriages and vans on the decks. It is stated that these coaches are the widest that have ever been shipped abroad from Liverpool. Colonel R. Ainley, traffic manager of the Mersey Docks and Harbour Board, superintended the manipulation of the engines and carriages on the dock quay.

Nearly Ready for Opening.

The new Mersey Tunnel, which has taken nine years to complete, its construction being inaugurated in December, 1925, by the Princess Royal (H.R.H. Princess Mary), who turned on compressed air into drills at the working shaft at George's Dock, Liverpool, will be ready for opening in the first week in July, when it is hoped H.M. the King will be present to perform the historic ceremony. The Joint Tunnel Committee at its January meeting decided to accept the tender of Sir Robert McAlpine Ltd., for the construction of a ventilating station at Morpeth Dock, Birkenhead, at a cost of £102,000. The total cost of the six stations, of which that at Morpeth

Dock is the last, will thus have been £570,000, being £17,000 below the cost originally estimated. The last station will not be completed for fourteen months, but this will not interfere with the forthcoming opening, as temporary ventilating arrangements will be made.

Tenders for air-flow meters at a cost of £4,000, and visibility apparatus for £1,686, were also accepted. These are scientific instruments which are being specially designed for installation in the tunnel. The engineer reported that on contract No. 8—the construction of the full-size tunnels on the Birkenhead side—the amount of which is £749,075, the estimated value of the work accomplished to date is £976,000 or 130 per cent. of the contract amount. The interior finish is complete, and laying of the cast iron roadway is continued, 64 per cent. having been done to date. The total value of the engineering works completed to date is £4,731,915.

Isle of Man Harbours.

Mr. Joseph Qualtrough, M.L.C., H.M. Receiver General for the Isle of Man, and by virtue of that office Chairman of the Isle of Man Harbour Commissioners, died at his residence in Castletown on Saturday 9th, December last; he had been Chairman of the Harbour Commissioners since 1919.

The late Mr. Qualtrough first entered the House of Keys as far back as 1897, when he was elected one of the members for the Sheading of Rushen, and remained a member of that House until 1919, when the House of Keys under an alteration in the constitution elected him to be one of their first four representatives in the upper House, the Legislative Council, and of which body he remained a member until his death. He was appointed H.M. Receiver General in 1919 by the Home Office.

He was born at Port St. Mary, and prior to his retirement carried on the business of Boatbuilder and General Merchant, Castletown. He was also a ship-owner, and his knowledge gained in these pursuits made him one of the most valuable chairmen the Harbour Commissioners have had.

Pending the appointment of a new Receiver General, Mr. R. C. Cain, M.L.C., J.P., the Deputy-Receiver General, is acting as Chairman of the Commissioners.

The Port of Amsterdam

The position of the Port of Amsterdam can be seen from the following figures in regard to number of vessels and tonnage and to the goods traffic arrived and sailed, as compared with the corresponding figures of last year.

SEAGOING VESSELS AND TONNAGE.

Dec.	1932	ARRIVALS				SAILINGS			
		No.	Per Cent.	N.R.T.	Per Cent.	No.	Per Cent.	N.R.T.	Per Cent.
	1933	301		431,182		296		442,494	
"	1933	289		409,441		283		419,516	
		-12	-3.99	-21,741	-5.04	-13	-4.39	-22,978	-5.19
Nov.	1933	299		401,123		309		424,493	
Dec.	1933	289		409,441		283		419,516	
		-10	-3.34	+8,318	+2.07	-26	-8.41	-4,977	-1.17
Jan.-Dec.	1932	3,314		4,737,638		3,321		4,736,777	
"	1933	3,313		4,634,706		3,333		4,722,900	
		-1	-0.03	-102,932	-2.17	+12	+0.36	-13,877	-0.29

SEAGOING GOODS TRAFFIC (In Tons of 1000 Kilos*).

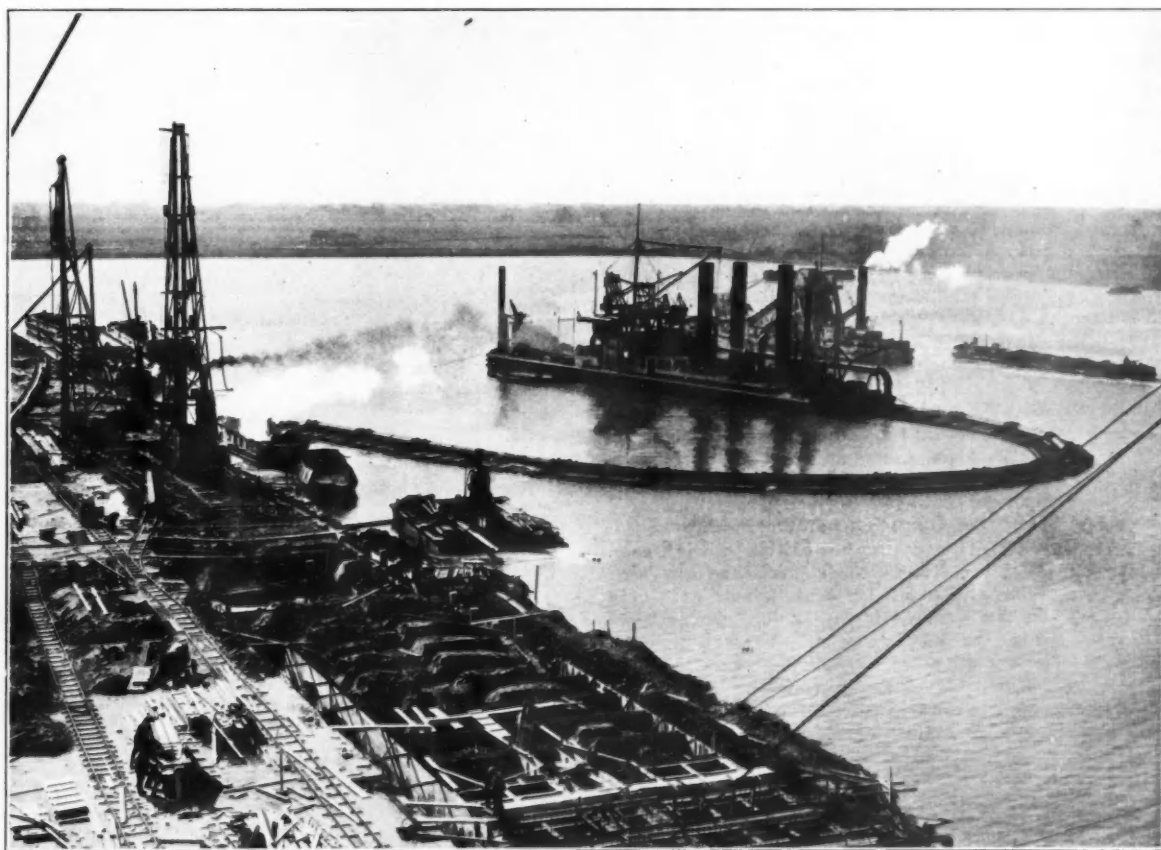
			1	2	3	4	5
			Import	Transit incl. in col. 1	Export	Transit incl. in col. 3	Total col. 1 & 3
Nov.	1932	...	282,013	59,932	129,723	29,515	411,736
"	1933	...	322,870	61,418	137,712	47,312	460,582
			+40,857	+1,486	+7,989	+17,797	+48,846
			+14.49%	+2.48%	+6.16%	+60.30%	+11.86%
Oct.	1933	...	303,579	56,393	139,336	52,085	442,915
Nov.	1933	...	322,870	61,418	137,712	47,312	460,582
			+19,291	+5,025	-1,624	-4,773	+17,667
			+6.35%	+8.91%	-1.16%	-9.16%	+3.99%
Jan.-Nov.	1932	...	3,136,060	564,814	1,412,719	349,904	4,548,779
"	1933	...	3,127,338	630,324	1,412,888	531,485	4,540,226
			-8,722	+65,510	+169	+181,581	-8,558
			-0.28%	+11.60%	+0.01%	+51.89%	-0.19%

*These figures have been taken from the monthly statistics of the Central Bureau, The Hague, Holland.

Classified according to flag, the number of vessels which entered the Port of Amsterdam during December, 1933, was:—Dutch 137, British 50, German 44, Swedish 25, Norwegian 18, Danish 3, Greek 3, Spanish 1, Lettish 1, Finnish 2, Estonian 1, Belgian 1, Jugo-Slavian 1, Russian 1.

Vessels laid-up at Amsterdam:—1st December, 1933,—28 vessels, measuring 118,561 tons gross; 1st January, 1933,—36 vessels, measuring 220,424 tons gross; 1st January, 1934,—19 vessels, measuring 72,538 tons gross.

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Hull and the East Coast

Proposed Improvements at Victoria Pier, Hull, and at New Holland.

THE proposed improvements at the Victoria Pier, Hull, and at New Holland, in connection with the Humber ferry services have been considered by the Humber Conservancy Commissioners, who do not offer any opposition to them. The advance drawings received from the Town Clerk show a floating pontoon 150-ft. in length by 50-ft. wide, and a bridge connecting with the shore. The Board have asked for the usual protection clauses as to dredging, lighting, fog signals, etc., as a condition of their assents. Alderman Wheeldon desires to make it clear that the dredging is a liability which will be assumed by the London and North-Eastern Railway, the owners of the ferry service. Details issued show that the Hull Corporation are proposing to expend £35,000 in the construction of the floating pontoon and alterations at Victoria Pier as their part of the undertaking, the cost to be recovered from tolls; while the L.N.E.R. are under an obligation to build new ferry steamers and make improvements at New Holland Pier at an estimated cost of £90,000. The L.N.E.R. have been given an assurance that should a scheme for a bridge over or a tunnel under the Humber be adopted within the next fifteen years they will be indemnified on the basis of the number of years elapsed. The work is to be put in hand at once, no special application to Parliament being necessary.

Meeting of the Humber Conservancy Board.

At the December meeting of the Humber Conservancy Board the Parliamentary Committee submitted a report on the provisions of the new bill for the Trent Falls Improvement Scheme, promoted by the Aire and Calder Navigation in the ensuing session of Parliament. A number of alterations, only slight, were suggested. The Bill is necessary to obtain an extension of time for the completion of the works, which consist of training walls at the confluence of the Trent and the Ouse, and increased borrowing powers to cover the additional cost of £113,000 by which the original estimate has been exceeded.

Greater Use of Hull Docks during 1933.

The docks at Hull during 1933 were put to much greater use than in the previous years. The net registered tonnage entering the port and paying dues was 6,521,418 tons, as compared with 6,133,444 tons in 1932. The King George Dock and Saltend oil jetties accounted for 2,637,200 tons, the Alexandra Dock for 1,619,237 tons, and the Victoria, Albert and other smaller docks for 2,264,981 tons. The increase of 387,974 tons is equal to 6.3 per cent. In comparison with 1913, which was a "boom" year, and the last before the Great War, there is, however, a decrease of 170,398 tons. The significance of this is heightened by the fact that in 1913 the King George Dock had not been opened for traffic, and that the oil depot at Saltend was only just beginning, and in that year dealt with only 8 per cent. of the quantity imported in 1933. It is evident, therefore, that the port, although it has lost 10 acres of water space in the past two or three years, is capable of dealing with a considerably greater volume of shipping than in 1933, good as that year's total is. Especially is this so in view of the many improvements in the direct handling of merchandise that have been effected in recent years. For example, in 1913 just upon eight million tons of coal was brought to Hull for export, and shipment as bunkers (and domestic use); last year the total was but 3,234,789 tons, or only 40 per cent. of the former year. Very much larger quantities of grain can now be handled at Hull, thanks to the fine silo at the King George Dock. Last year the imports of wheat and kindred cereals amounted to no less than 1,397,700 tons, or 205,816 tons in excess of 1932, while imports of oilseeds, nuts and kernels aggregated in round figures 575,000 tons, a decline of 82,000 tons. The arrivals of timber (hewn and sawn) reached the aggregate of 1,065,000 loads, one of the highest totals in the history of the port, and only comparable with 1928. Soviet cargoes to the number of 116 came to hand late in the season to swell the total and incidentally to cause dock congestion, which lasted several weeks. Imports of petroleum approached 600,000 tons and constituted a "record" for the port, while sheep's wool at 62,000 tons was above recent average. From the foregoing it will be seen that the import trade was well maintained in the main items. Unfortunately, the overseas trade in fruit, dairy produce and general merchandise showed a marked shrinkage, while the exports of coal from Hull were only a shade better than in 1932, a notoriously poor year. Shipments of bunkers were around 1,500,000 tons and an advance. Pending an amendment of the Coal Mines Act in the interests of the coal export trade, exporters are hopeful that arrangements will be made to increase the supplies of coal for shipment and bring

into greater use the excellent appliances the port possesses for the expeditious handling of coal. The latest addition to the appliances is an anti-coal breaker at the Alexandra Dock.

Provisional figures show that the quantity of coal exported foreign from the Humber ports in 1933 was 3,255,328 tons, as compared with 3,335,891 tons in 1932; and from Boston and Lynn 309,954 tons, against 426,016 tons. The shipments of bunker coal on vessels engaged in foreign trade exceeded three million tons.

That the extensive accommodation provided at the Albert Dock for the fishing industry at Hull has been taken full advantage of is indicated by the fact that the landings of wet fish by Hull trawlers in 1933 again exceeded four million cwt., and were a substantial advance on 1932.

Immingham Dock Statistics.

During the month of December, 1933, a total of 94 vessels representing a net registered tonnage of 112,764 used Immingham Dock, including eight vessels totalling 13,435 net registered tons using the Western Jetty coaling berth; as compared with December, 1932, when 122 vessels totalling 149,437 net registered tons used the port, including 18 vessels totalling 29,938 net registered tons using the Western Jetty.

Immingham Imports and Exports.

The following are figures giving details of imports and exports for the 11 months ending November, 1933, as compared with the same period during 1932.

IMPORTS				
		1933 Tons	1932 Tons	
Mining Timber	...	64,782	39,120	
Sleepers, etc.	...	13,874	6,670	
Iron Ore	...	165,070	73,061	
Sugar	...	11,793	20,773	
Scrap Iron and Steel	...	1,653	—	
Phosphate Rock	...	5,058	—	
General	...	2,661	—	
Total	...	264,891	139,624	

EXPORTS				
		1933 Tons	1932 Tons	
Coal	...	1,858,628	1,892,640	
Coal Tar Dressing	...	—	3,454	
Slag	...	33,339	27,317	
Pig Iron	...	33,211	56,348	
Iron and Steel	...	19,631	22,729	
Tin Plate Bars	...	15,657	—	
Sulphate of Ammonia	...	—	15	
Scrap Iron and Steel	...	98	480	
Glass	...	489	1,090	
Creosote	...	5,783	6,129	
General	...	9,573	8,711	
Total	...	1,976,409	2,020,913	

No. of Vessels and Net Registered Tonnage.				
		12 months ending December 31st, 1933 No. N.R.T.	12 months ending December 31st, 1932 No. N.R.T.	
Vessels in Dock	...	1,096	1,313	801
Vessels using Western Jetty	...	237	422	756
Total	...	1,333	1,736	557
		1,386	1,902	339

Inspection of New Fog Horn at North Pier, Bridlington.

A deputation from the Scarborough Harbour Commissioners, consisting of Capt. Snowden, Capt. Alden and the Harbour Master (Capt. Andrews), have visited Bridlington and inspected the new fog-horn which has recently been brought into use on the North Pier. It is regarded as one of the most efficient on the North-east Coast, and it was in consequence of the difficulties experienced at Scarborough that the Commissioners decided to visit Bridlington. The Harbour Master (Lieut. E. Taylor) demonstrated the fog-horn to the visitors who expressed their high approval of it. The Scarborough fog-horn, which cost between £400 and £500, has not always given the satisfaction expected, and recently, during a dense fog, a steam trawler's syren had to act as guide for the Scarborough fishing boats making the harbour.

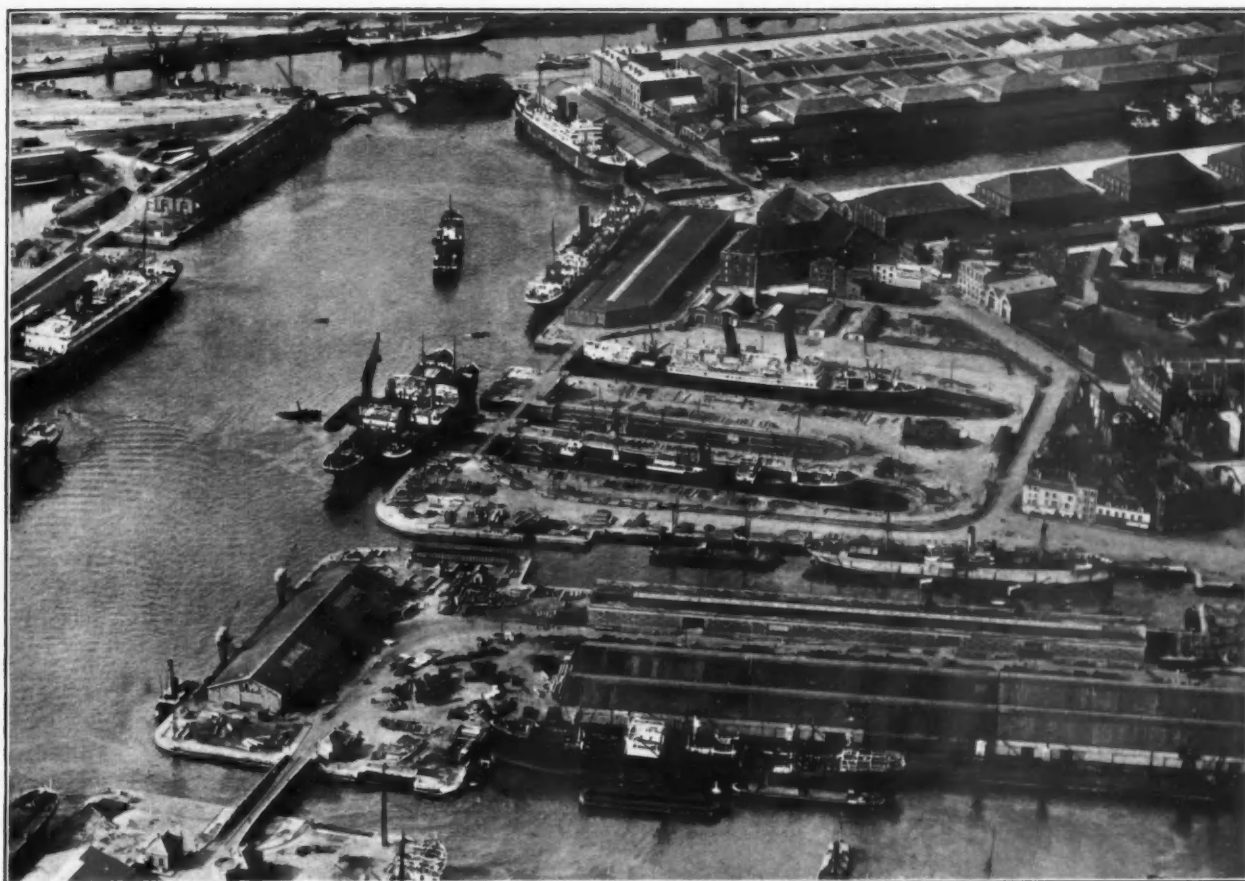
Order for Seventy Marconi Direction Finders

Messrs. Alfred Holt and Co. have placed an order for 70 Direction Finders with the Marconi International Marine Communication Co., Ltd. When these instruments are fitted all Blue Funnel ships will be provided with Direction Finders.

This is an exceptionally large order from a single company, and will bring the number of ships fitted with Marconi Direction Finders up to over 1,400.

The Port of Havre

(Translated from the French)



Aerial View of the Port of Havre, showing the Eure Dock on the left, with the Vauban Dock in the background. On the right of the picture is shown the Warehouse Dock in the background, then Drydocks Nos. 4, 5 and 6, and in the foreground, the Bellot Dock.

Historical.

FROM its foundation in 1517, by King Francis the First, up to the end of the 18th Century, the port of Havre comprised little more than the King's Dock, and what was then the Outer and is now the Inner Harbour. It was both a military and a commercial port. During the 19th Century, new docks of ever-increasing size and better equipped to meet the advancing needs of navigation and of trade, were conceived, constructed and put into commission.

The present population of the town is about 165,000. The volume of shipping entering and leaving the port is about 20 million N.R. tons, the figures for 1932 (the latest yet available) exceeding those for 1931, in spite of the unprecedented world depression, owing to the progressive policy of port improvement having proved attractive to foreign steamship lines. American traffic in particular, which was negligible in pre-War days, amounted in 1932 to nearly 1½ million N.R. tons entering. As compared with 1913, the last normal year before the War, the volume of shipping has nearly doubled. This is largely due to favourable geographical situation in relation to

Paris (which is distant 228 kilometres, or 141 miles, by rail) and Eastern France, and to communication by way of the Tancarville ship canal with the whole system of inland navigation.

Constitution.

Since 1925 the Port of Havre has been a self-governing organisation, administered under the conditions laid down by the law of 12th June, 1920.

The administration is carried on by a Council or Board of 21 members, comprising:—

Nine members appointed by the Havre Chamber of Commerce;

Nine members appointed by decree, i.e.:

One each on nomination of Chambers of Commerce of Bolbee, Rouen and Paris;

One representative, each, of the State Railways, of the Eastern Railway, and of the Ministry of Finance;

Three chosen from among the principal users of the port;

One member appointed by the General (or County) Council of the Seine Inférieure;

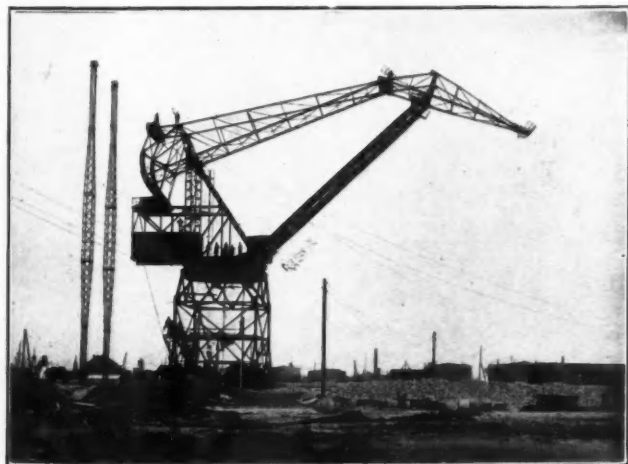
One by the Town Council of Havre;

One Labour member, representing the port workers.

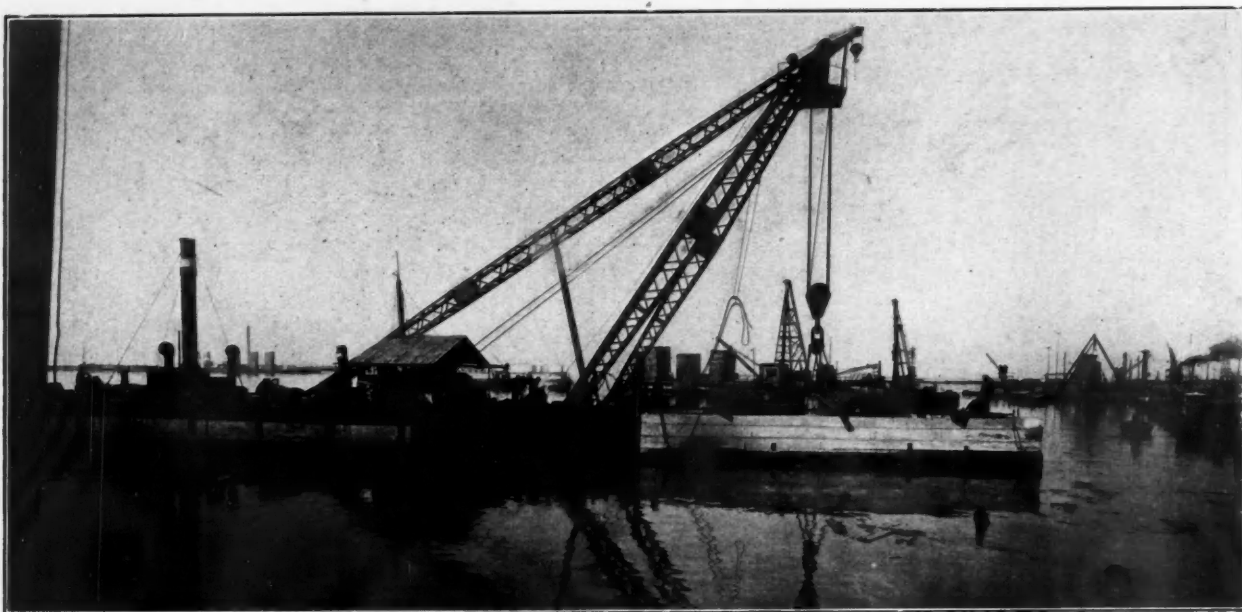
The Council of Administration or Governing Board controls all that concerns the works, the equipment and the operation of the port, excepting projects which involve material alteration in the port works or approaches, or which are carried out with State assistance.

The Board thus exercises, in a large measure, the functions formerly appertaining to the Public Works Department. This decentralisation facilitates the more speedy transaction of a great deal of the business of the port and the rapid execution of works of equipment and of major and minor maintenance. Moreover, the procedure in regard to new construction is not much altered. The State contributes towards such works a grant which may amount to as much as one-half of the total cost.

The Port Manager is the executive agent of the Board in every matter falling within its competence. He is entitled by law, as agent of the central authority and within the limits of the port, to exercise general supervision over all public services



20-ton Crane, at No. 7 Drydock, 1,025-ft. long.

The Port of Havre—continued*575-ft. Quay. Transporting the Third Caisson.*

concerned in its exploitation, particularly those of Public Works, Railways, Inland Waterways, Lights and Buoys, Customs, Pilotage, Public Health and Port Police. This enactment establishes concentration of control, which had been repeatedly recommended by the users of the port.

Whilst the State (by the Public Works Department) made over to the Port, when given its independence, all works such as quays, locks, offices, machinery, etc., as constructed by the department: the Chamber of Commerce likewise surrendered to the Port all the equipment which the Chamber had previously owned and operated, such as sheds, cranes, fire-floats, etc., the Port Administration acquiring in this way the management of the entire organisation of the port, both on land and water.

Traffic.

The Port of Havre, though of great importance from the point of view of tonnage of goods in imports and exports, does not take first place among French ports in this respect, but excels them all by far in the amount of its customs' receipts, exceeding 1,000 million francs. This arises from the fact that Havre does not import much in the form of heavy goods of low value, but, on the other hand, it is the chief port of France for valuable merchandise (see Appendix 1).

The principal articles comprised in its trade are: coffee, cotton, cocoa, rum, copper, nickel, leather and tropical hardwoods for use in manufacture of furniture and of dyestuffs. For some years past, moreover, Havre has been taking a place of increasing importance in importation of petroleum, owing

to the installation of large refineries in the immediate neighbourhood.

The Port of Havre is likewise a place of considerable activity in passenger traffic. It is the terminal of steamship lines of the Compagnie Générale Transatlantique, serving North and Central America, and is a port of call for the United States Lines, the Baltimore Steamship Company, the Atlantic Transport Company, the Red Star and Arnold Bernstein Lines, for the United States, the Cunard and White Star Lines for Canada. A regular service connecting Havre with Southampton affords travellers the most comfortable and convenient route between France and England. Lastly, Havre is in daily communication with the ports of the Normandy Coast—Honfleur, Trouville and Caen.

Accommodation.

The port is reached from the seaward side by an approach channel, four kilometres ($2\frac{1}{2}$ miles) long, which is in process of being deepened to 10.8 metres (35½-ft.) below zero of charts.

At the present time the port includes two outer harbours, an inner harbour, ten wet docks (in one of which the water is maintained at constant level) and a large tidal basin. The water area of the enclosed docks, exclusive of the tidal basin, is about 88 hectares, or 220 acres. Vessels are admitted to these by two entrance locks during 16 hours of the 24. The tidal basin, accessible at all states of the tide without locking, receives the large transatlantic liners. On the north side of this basin is a quay more than two kilometres ($1\frac{1}{4}$ miles) long, for berthing the ships. On the south, along the south breakwater, special docks have been formed for the reception of oil-tankers, whose cargoes are discharged into 33 shore tanks, having a total capacity of 125,000 cubic metres, or 25 million gallons.

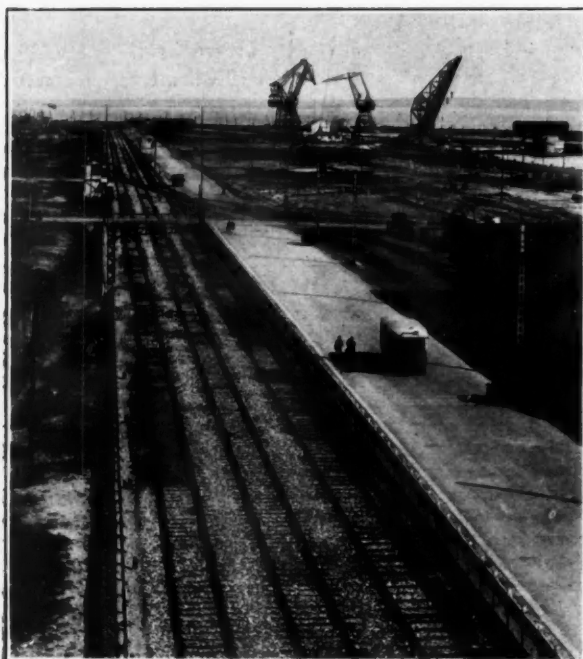
Equipment.

The Port of Havre is provided with several modern sheds, equipped with all appliances needed by travellers, who are able to pass, while under cover throughout, from ship to rail or rail to ship. Two new sheds are under construction, one of which, on the Joannes Couvert Quay, 600 metres long by 40 metres wide (about 1,970-ft. by 130-ft.), can accommodate at one time two of the largest liners in the world. The other, on the "oblique" jetty, is being erected by the Compagnie Industrielle Maritime.

Dry-docking accommodation includes seven graving docks, one of which is of very large capacity, measuring 313 metres (1,025-ft.) in length by 38 metres (125-ft.) in effective width. In addition, there is a 3,500-tons floating dock with two pontoons and a large floating dock of 16,500-tons lifting capacity, fitted with the most up-to-date mechanical improvements. A summary description of this floating dock is given in Appendix 2. There is also a gridiron for hull inspection and overhaul.

Mechanical-handling plant comprises 240 machines, ashore and afloat, of all sorts and sizes, ranging between $1\frac{1}{2}$ and 200 tons. Most of these machines are electrically driven, but some are hydraulic.

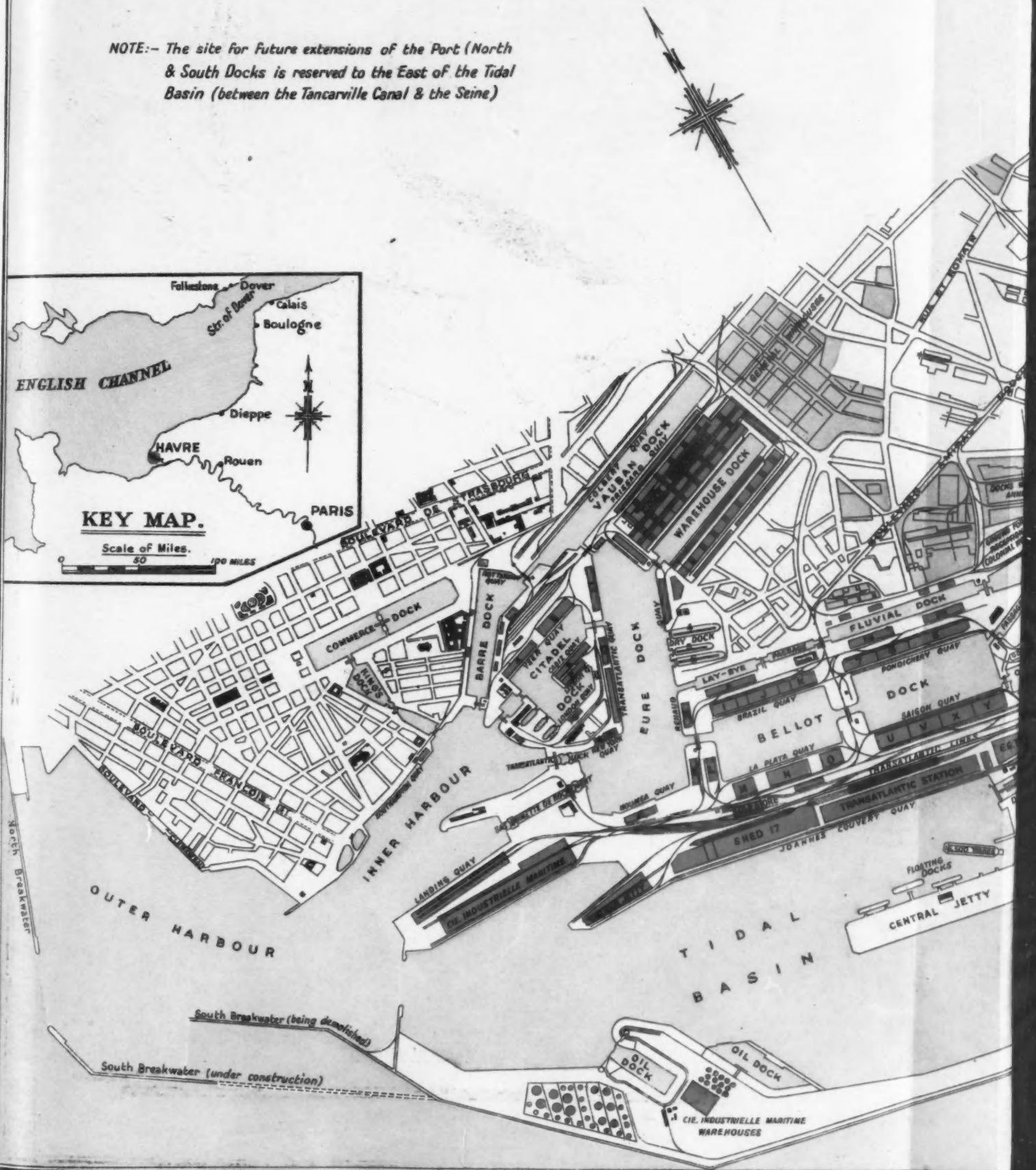
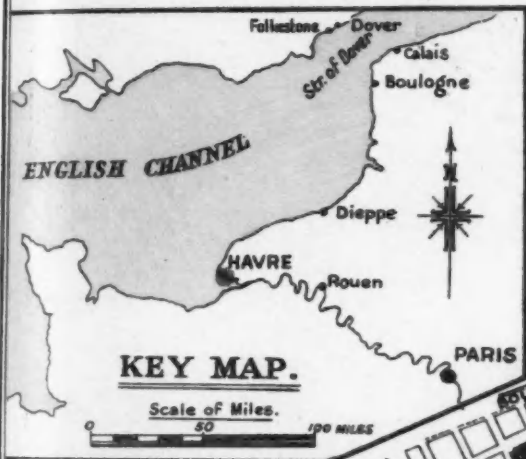
Finally, the port puts at the disposal of its patrons 54 sheds, having an aggregate covered area of 330,000 sq. metres (33 hectares, or 80 acres), to which may be added the dock warehouses and other public and private stores, extending over more than 100 hectares, or 250 acres.

*Transatlantic Lines: looking East.*

PORT OF HAVRE.

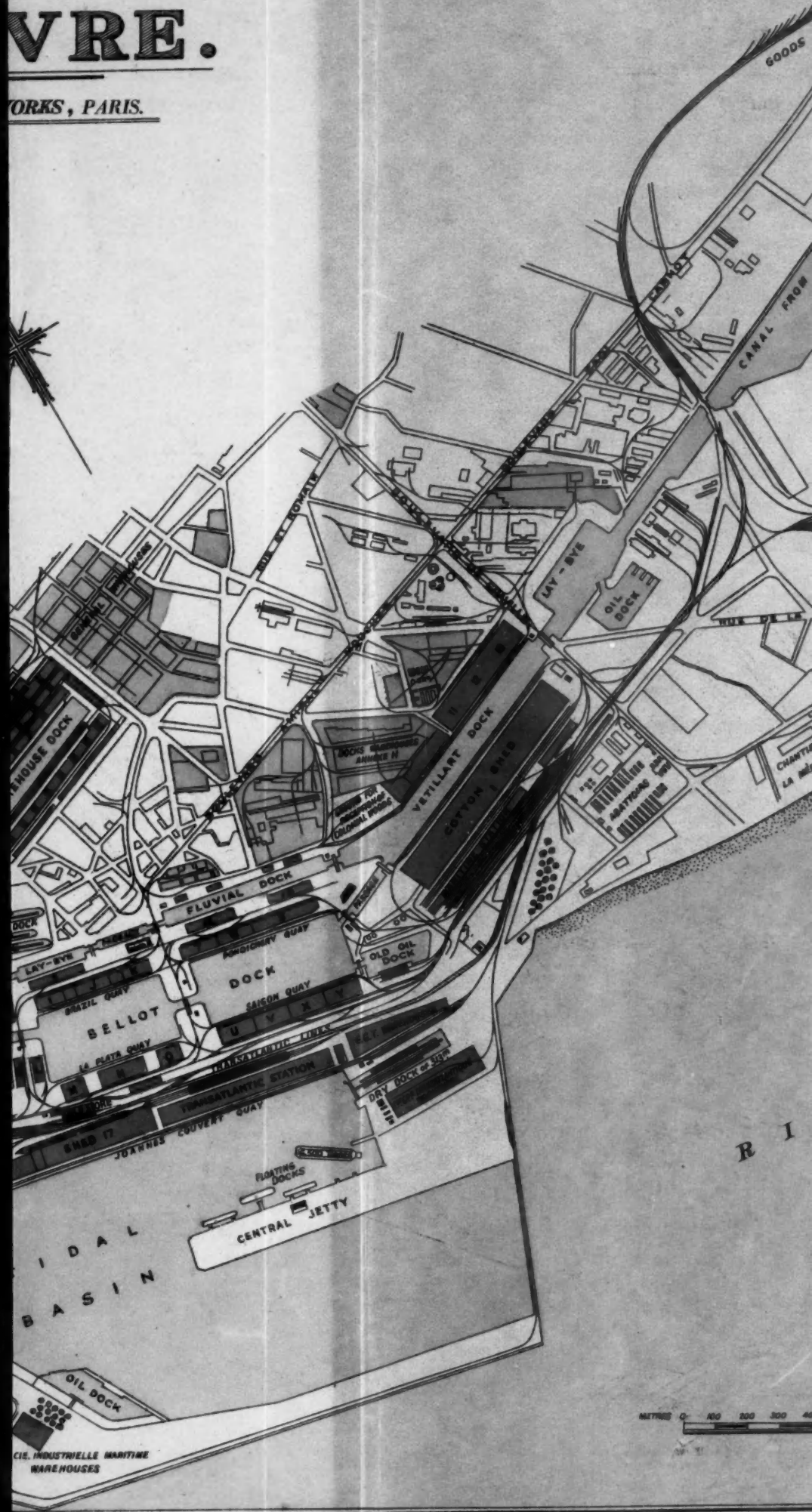
UNDER THE JURISDICTION OF THE MINISTRY OF PUBLIC WORKS, PARIS.

NOTE:— The site for Future extensions of the Port (North & South Docks) is reserved to the East of the Tidal Basin (between the Tancarville Canal & the Seine)



MAP OF THE DOCK AND HARBOUR AUTHORITY, FEBRUARY 1911.

WORKS, PARIS.



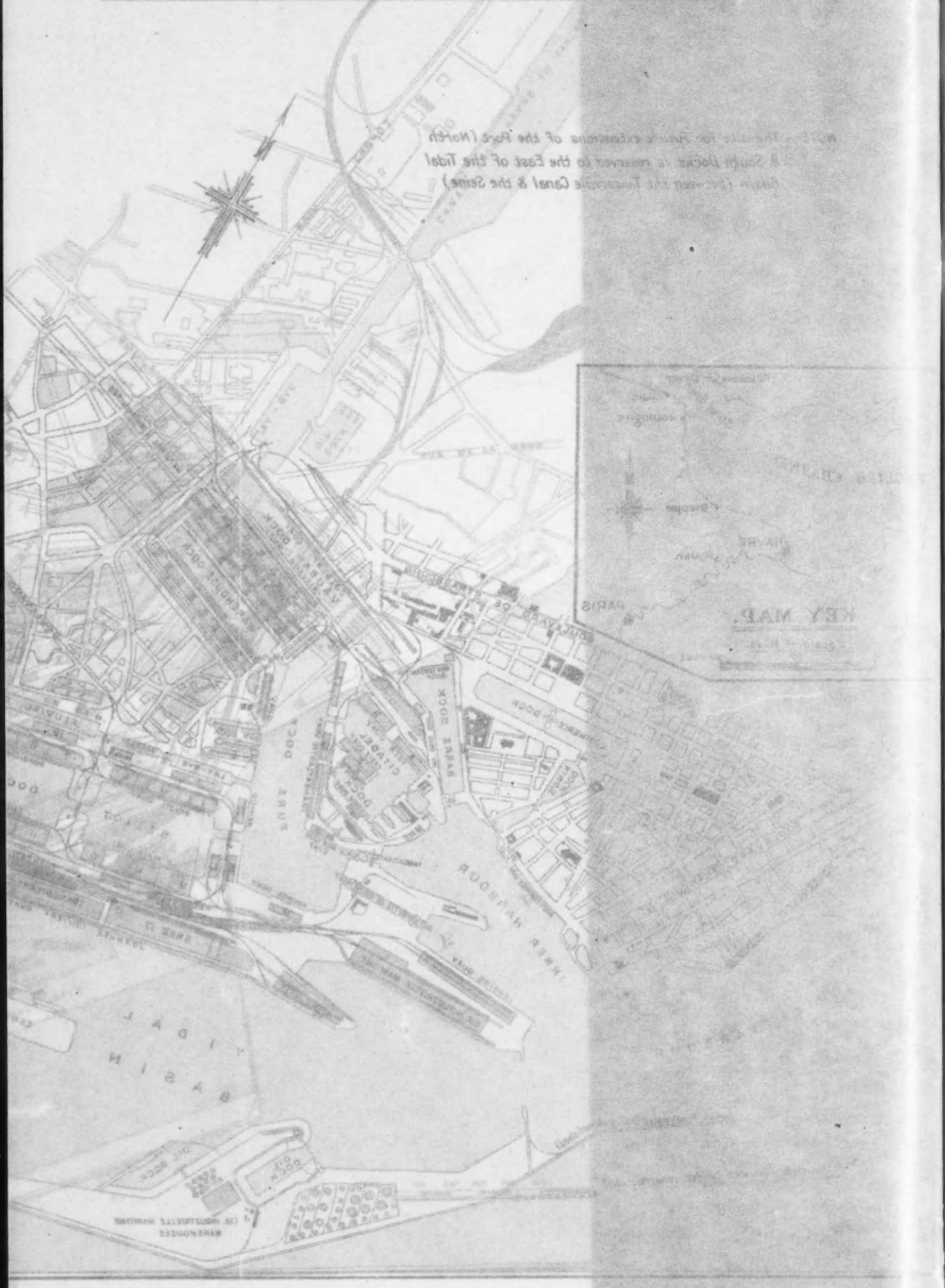
JANUARY, 1934.



PORT OF HAVRE.

UNDER THE JURISDICTION OF THE MINISTRY OF PUBLIC WORKS, PARIS.

NOTE.—The site for the extension of the Port (North & South) docks is reserved to the East of the tidal basin between the Tancarville Canal & the Seine.



The Port of Havre

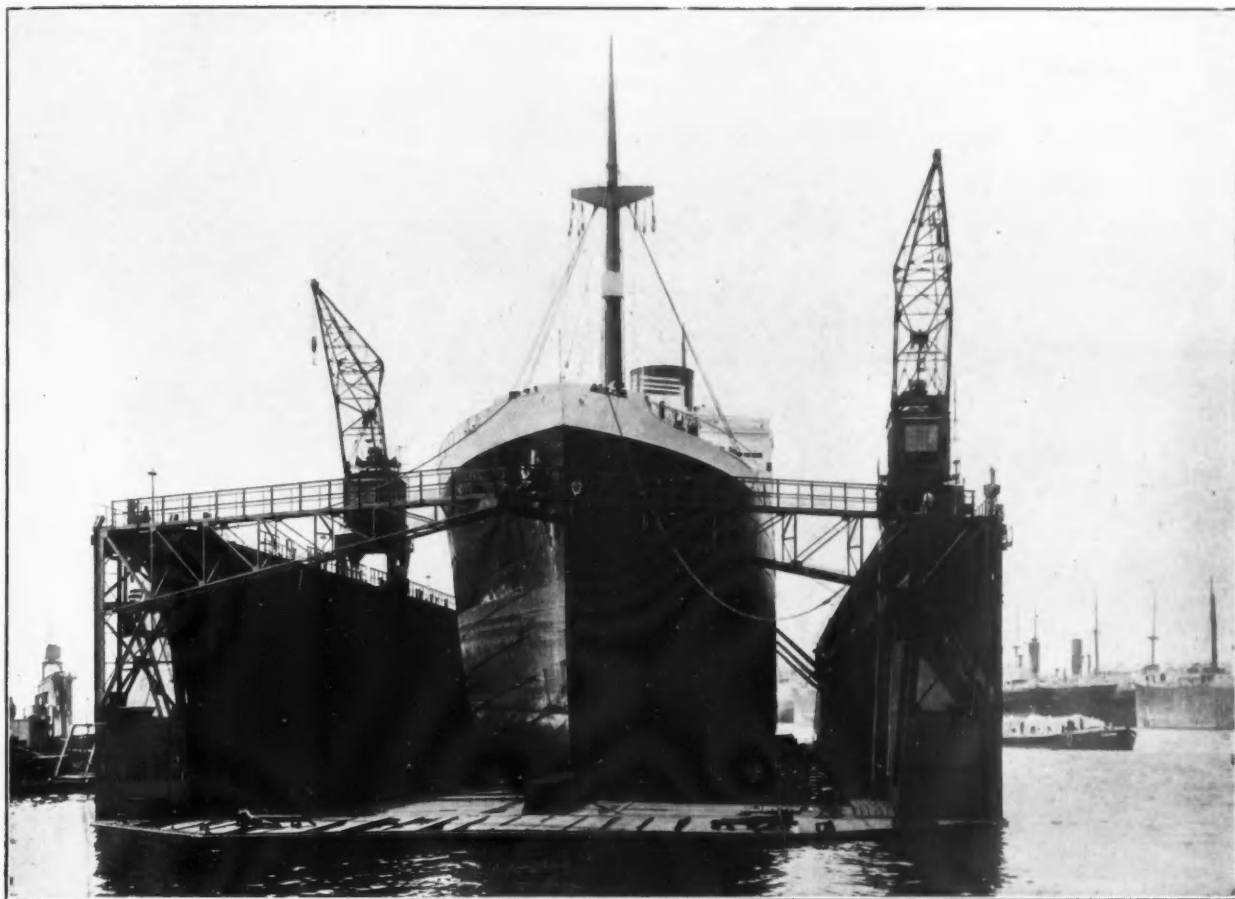


Aerial View of the Port of Havre, showing the Outer Harbour in the foreground, the Inner Harbour and Docks in left background, and Tidal Basin and Oil Dock to the right.



Aerial View of the Port of Havre, showing the Warehouse Dock in left foreground and the Vauban Dock in right foreground. The Eure Dock is in the centre and to the left, the Citadel Dock to the right and adjoining, with the Barre Dock on the extreme right. In the background the Oil Dock is seen on the left, while the Entrance to the Port is on the right.

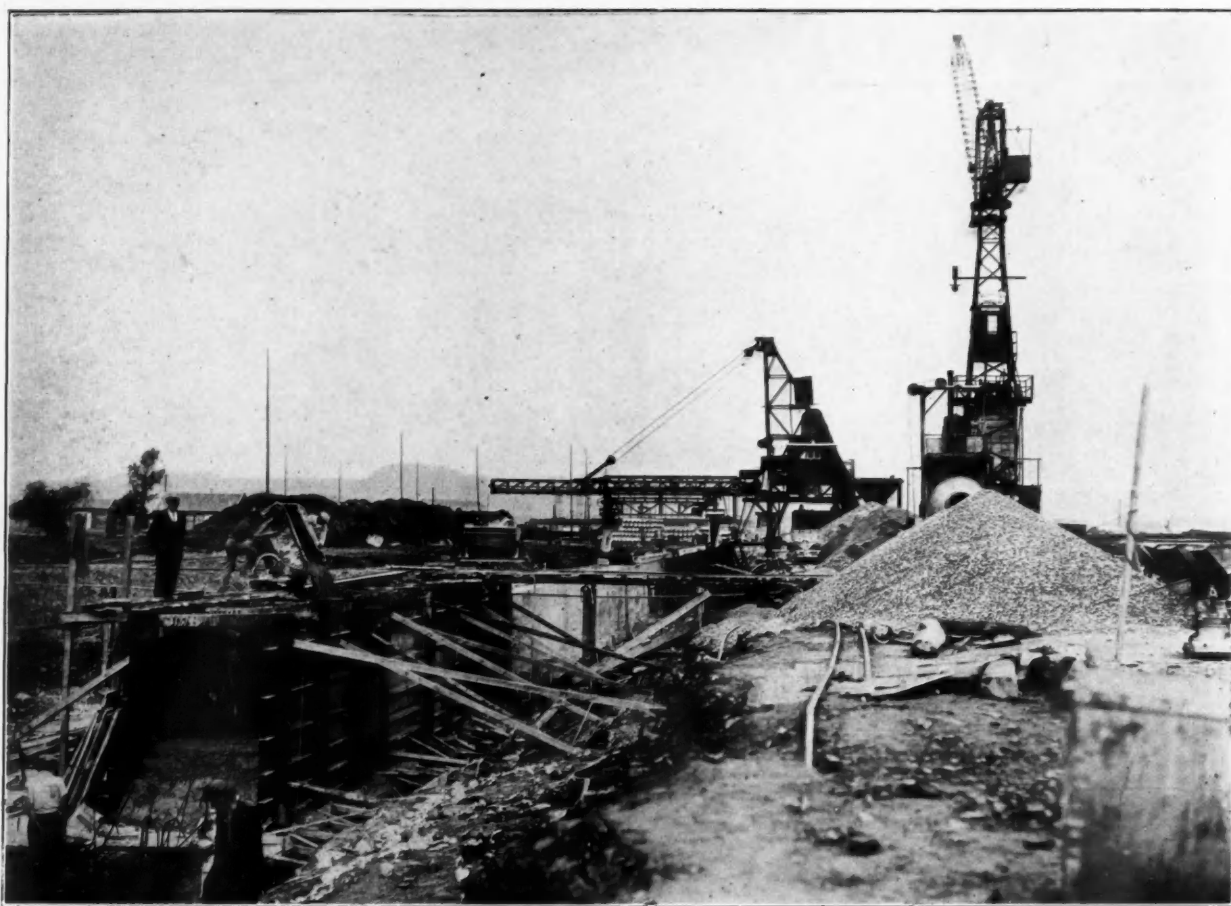
The Port of Havre



S.S. "Wyoming," of the Compagnie Générale Transatlantique, in the 16,500 tons Floating Dock.



Floating Crane, 10 : 40 : 60 tons lift.

The Port of Havre—continued*Construction of 2,000-ft. Quay on the Tancarville Ship Canal.***Keel-blocks.**

There is a single central row of steel keel-blocks, spaced at 1.26 metres (4-ft. 1½-in.) centres and 1.2 metres (3-ft. 11-in.) in height. The base carries capping timbers of oak 12 inches and soft wood 3 inches thick.

Bilge-blocks.

To prevent lateral movement there are 22 pairs of adjustable bilge-blocks, each comprising a steel joist hinged at the inner end and carrying pads of oak and soft wood. The outer end of each joist is supported on a rolling carriage, whose movement raises or depresses the pads as requisite for contact and support of the ship. The carriages are moved by mechanism—of shafts, pulleys and chains—so arranged that they are adjusted in groups of seven or eight blocks acting together. The power is electric, with hand operation in case of failure of current.

Mechanical Shores.

For placing the ship centrally in the dock and holding it so until it has settled down on the blocks, there are 5 pairs of mechanical shores fitted to the inner faces of the side pontoons. These also are electrically operated, the essential feature being an articulated arm adjusted by suitable attachments and bearing at its extremity a roller making contact with the ship's side. They move in opposing pairs, the units of each pair being both operated from the same point on the port-side upper deck.

Control Cabin.

In this cabin are found the following controls:—Luminous indicators of the positions of valves, signals to guide in operating the main pumps, 36 pneumatic indicators of water level in the ballast tanks, 2 indicators showing lateral and longitudinal inclination, the indicator of curvature or distortion of the dock under load, and 2 pneumatic indicators showing depth of water over the blocks.

Fire Pump.

A high-pressure centrifugal pump serves as fire-pump, as well as for pumping ballast water for ships using the dock, for cleaning of hulls and other purposes.

Equipment.

Four electric capstans are fixed at the extremities of the upper decks of the side pontoons. These exert a pull of 10 tons at a speed of 8 metres (26-ft.) per minute, and the direction of rotation is reversible. They can be worked by hand in emergency.

An electric crane travels on each of the upper decks, having a lifting capacity of 5 tons, a radius of from 9 to 17 metres (30 to 60-ft.) and a lift of 24 metres (80-ft.).

Compressed Air.

For pneumatic tools employed in ship-repairing, compressed air at 7 kilos per sq. cm. (100 lbs. per sq. in.) is supplied by three rotary compressors, one of 3-cubic-metre capacity and two of 25 cubic metres each, driven by electric motors, direct coupled. The power required is 26 h.p. for the first and 162 h.p. for each of the other two. Distribution is effected by a ring main round the dock, with 56 connecting points and valves.

Fresh and Salt Water.

Fresh water is supplied through a main carried on the inner face of the pontoon which bears the control cabin and the main is fitted with five hydrants.

The sea-water main, which serves also for fire extinction, is carried on both sides of the dock and has twenty hydrants.

Being designed for docking large cargo vessels and medium-sized liners, this drydock constitutes a very useful addition to the repairing facilities of the port, which is thereby rendered one of the best equipped in the country in this respect.

Weser Inland Shipping in November, 1933

Of the 334 days of the current year on the Upper Weser 282 and on the Middle Weser 259 days, permitted no full loading of vessels. The water levels of 1933 are the worst since 1929.

Goods' traffic through the Bremen Weser Lock in November, with 134,900 tons in both directions, was 20,800 tons, or 13 per cent. less than the previous month. Downstream traffic amounted to 104,700 tons less by 14,000 tons, or 12 per cent.

During the eleven months of the year altogether 1,352,500 tons, or 113,400 tons, equal to an increase of 9 per cent., were carried, compared with the same period of the previous year. This increase falls to downstream traffic alone, which amounted to 1,018,100 tons, and was thus 11 per cent. larger. Piece-goods showed a greater increase. Upstream traffic was exactly the same as the previous year at 334,400 tons.

The Port of Seattle

By J. R. WEST, Mem. Am. Soc. C. E., Chief Engineer



Bell Street Terminal, showing wharf and two-storey transit shed and reinforced concrete warehouse.

SEATTLE is situated in the north-western part of the United States in latitude 47 degs. 36 minutes North, longitude 122 degs. 20 minutes West of Greenwich.

It lies on Elliott Bay, which is an indentation in the mainland shore of Puget Sound, which in turn is connected by Admiralty Inlet and the Strait of Juan de Fuca with the Pacific Ocean. The distance from Seattle to the ocean at Cape Flattery is 125 nautical miles, and connecting channels are from 2 to 15 miles wide and from 25 to 150 fathoms deep.

Elliott Bay extends east for a distance of three miles from a line connecting West Point and Alki Point, which are approximately five miles apart. On account of the great depth of the bay, anchorage for ships is confined to a comparatively small area close inshore along the central waterfront, at Smith's Cove and along the south and west sides of the bay. Tidal currents in the bay are of negligible velocity, pilotage is not compulsory, either in the channels approaching Seattle from the ocean or in the harbour itself.

Seattle has Elliott Bay and Puget Sound on the west and Lake Washington on the east, with Lake Union lying in the heart of the city. The salt water of Puget Sound is connected with the fresh water of the lakes by the Lake Washington Ship Canal, which passes through Lake Union on its way from the Sound to Lake Washington. This canal has sufficient depth and width to accommodate ocean shipping and gives Seattle a fresh-water harbour in Lakes Union and Washington, in addition to the natural salt-water harbour in Elliott Bay.

Shipping at the port of Seattle dates back to December, 1851, when the brig "Leonor" cleared for San Francisco with a cargo of piling and poles. Since the advent of railroad service in 1888 and the inauguration of trans-Pacific steamship service in 1896, there has never been a real halt in the growth of the commerce handled through Seattle.

Eighty-four regular steamship lines now connect Seattle with ports in all parts of the world; six trans-continental railway systems connect Seattle with the centres of population in the United States and Canada.

The commerce of Seattle includes a wide range of products. Alaska contributes several million cases of tinned salmon every year, as well as copper ore, lime stone and salt fish in large quantities. From the Orient come vegetable oils, wool, bean cake, nuts, carpets and rugs, matting, porcelain, tea and raw silk. California contributes tinned fruit, oranges, lemons and petroleum products. Ships from the Atlantic Coast of the United States and from Europe via the Panama Canal bring paper, cast-iron pipe and steel in various forms, as well as manufactured articles. Ships to the Orient take lumber, wheat, flour, fish, paper and fruit from the local tributary territory and manufactured goods from a territory reaching back to the Atlantic Coast.

The following table gives the total foreign and domestic commerce in tons and valuation handled through Seattle:—

Year	Tons	Value \$
1904	1,159,234	75,696,554
1909	1,712,993	122,439,112
1914	2,144,933	154,599,947
1919	5,496,666	750,071,907
1924	7,611,592	664,567,049
1929	9,167,295	771,174,069
1930	8,362,579	605,983,201
1931	7,287,354	445,695,394
1932	5,797,024	300,167,001

On account of the natural depth in the approaches to Elliott Bay and in the bay itself, no dredging has been required to make a harbour for Seattle. All that was necessary was to build piers and wharves for the ships to lie alongside while

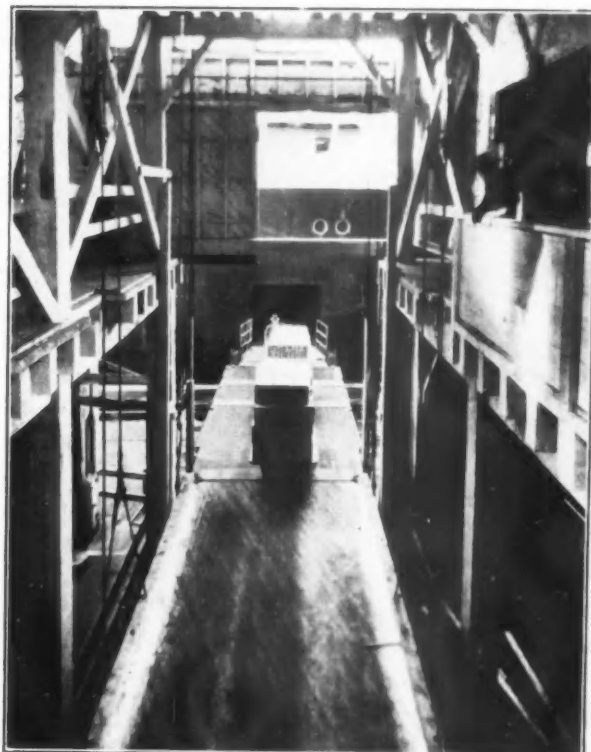
loading and discharging cargo. The earlier waterfront terminals were built and owned largely by the Railroads. They were, in general, leased to steamship companies or to operating dock companies.

By 1910, with the approaching completion of the Panama Canal, the sentiment in Seattle became general that if the port were to get its share of shipping it would be necessary to provide additional modern terminals, constructed without delay, and, for the proper encouragement of shipping, to have these terminals publicly owned and operated. Authority was therefore obtained from the State of Washington and the Port of Seattle was organised.

The Port of Seattle is a municipal corporation that includes Seattle and the surrounding territory contained in King County. The Port District has the power to acquire land and build facilities to promote commerce and shipping. It has expended over \$12,000,000 in acquiring land and building modern terminals, designed to facilitate the handling of the various kinds of cargo peculiar to the port. In all, seven terminals have been provided, each adapted to serve certain specific kinds of cargo and shipping.

The Salmon Bay Terminal, located on the south side of Salmon Bay, above the locks of the Lake Washington Ship Canal, offers opportunity for the mooring and repair of boats of the fishing fleet that operate out of Seattle. This terminal includes moorings, two marine ways for hauling out boats for painting and repair, and complete machine shops.

The Smith's Cove Terminal consists of two piers, Nos. 40 and 41, each about one-half mile in length. Pier 40 is 310-ft. in width, and Pier 41, 367-ft. At the shore end of Pier 41 there are two 2-storey transit sheds with depressed railroad



Bell Street Terminal. View from upper floor of transit shed looking towards ship, showing freight elevator and adjustable section of platform with loaded four-wheel trucks.

Port of Seattle—continued

Lenora Street Pier and at right Lenora Street Reinforced Concrete Viaduct.

tracks between, and with open wharf aprons with two railroad tracks, on the water side. The American Mail Line ships dock at this pier, using the upper storey for passenger accommodations. The upper floors of the two sheds are connected by bridges to a reinforced concrete viaduct along Garfield Street, so that the upper and lower floors are reached by motor truck and automobile equally well. The outer 2,000-ft. of this pier is open wharf, well served by railroad tracks, and is used for the handling of heavy cargo that does not require covered storage space.

Oil pipe lines are installed to carry vegetable oil, pumped from the ships, to steel storage tanks standing on filled ground north of the pier, or into tank cars standing on the depressed tracks between the sheds. Pipe lines for fuel oil and gasoline are also laid on the pier to convey these oils from tankers lying alongside to steel tanks constructed on land leased by the Port to Oil Companies.

Pier 40 has a U-shaped one-storey transit shed at the outer end of the pier that provides three berths for ships. North of this transit shed there have recently been constructed four two-storey transit sheds, two on each side of the pier. The new

sheds were built primarily for the handling and storage of tinned salmon. Down the centre of the pier between the new sheds is a concrete roadway and four depressed railroad tracks. On each side of the pier is an open wharf apron with two railroad tracks.

The Bell Street Terminal, located at the foot of Bell Street in the central district of the waterfront, is near the market and retail districts. It consists of a wharf carrying a two-storey transit shed that runs out at an angle of about 45 degs. with Railroad Avenue for a distance sufficient to give one ship's berth, and then extends parallel to the shore for about 800-ft. Behind the wharf, separated by two depressed tracks, is a four-storey reinforced concrete warehouse and office building. Most of the warehouse space has been equipped for the cold storage of perishable products, and is now used largely for the storage of salt herring and mild cured salmon, although nuts, potatoes, celery, and other food products are also stored in this warehouse.

The natural topography is such that a bridge over Railroad Avenue connects the warehouse at the third-floor level with the streets leading up town. A ramp leads from the west end of the bridge down to the second floor of the transit shed at the south end, and another ramp leads down to the north to connect with the second floor of the transit shed at that end and then turns south and runs down to the level of the wharf and Railroad Avenue.

Certain alterations have recently been made in the Bell Street Terminal in order to provide suitable facilities for the new ships of the Grace Line that give an express service for passengers and freight between Atlantic and Pacific Coast ports of the United States by way of Central America and the Panama Canal.

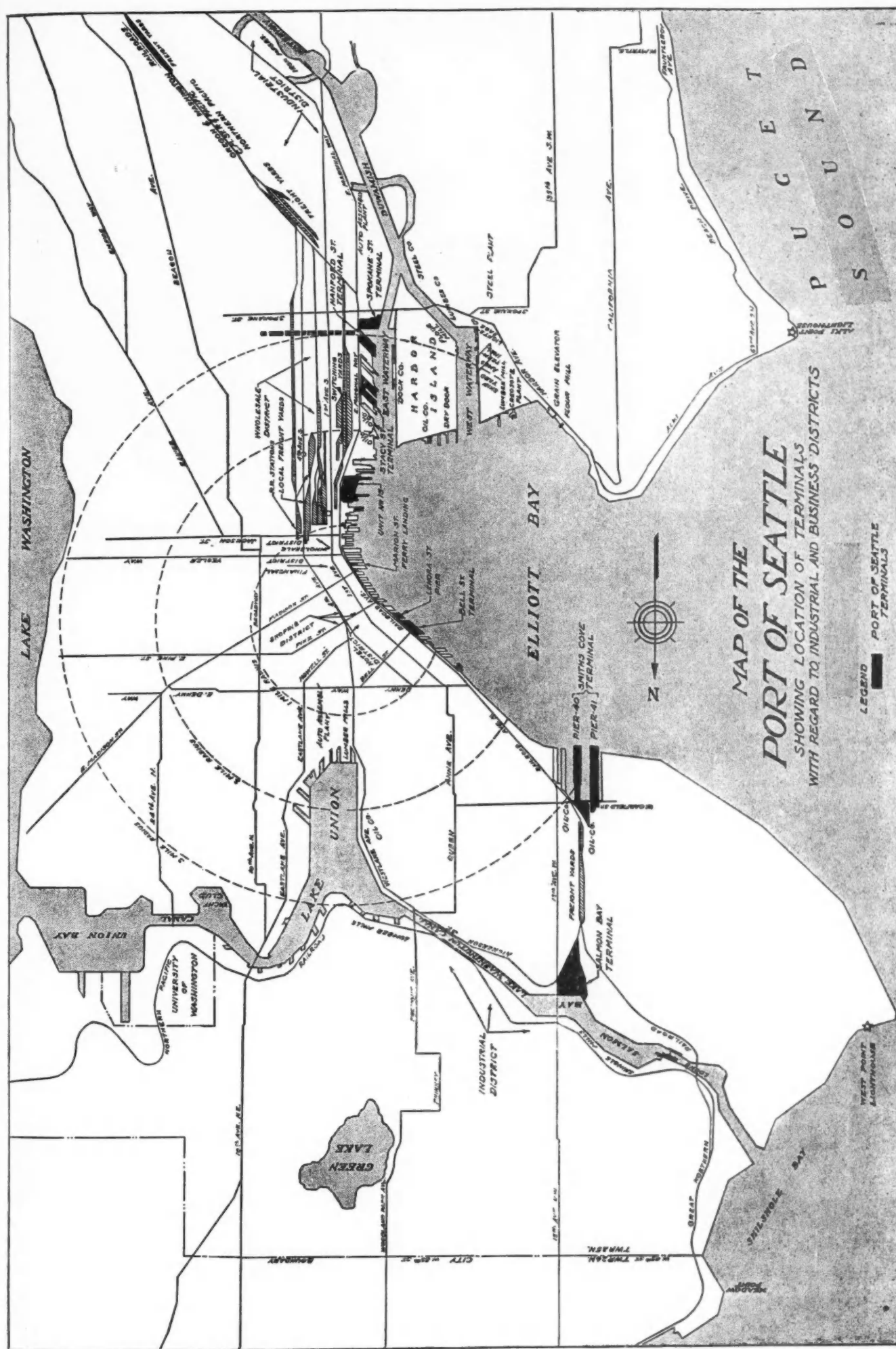
These new ships, in addition to two hatches forward of the super-structure and one aft, are equipped with side ports for loading and discharging cargo. On account of the large range of tide at Seattle, maximum 17-ft., adjustable connections between the side ports and the wharf deck are essential. Ordinary adjustable inclined ramps were obviously out of the question. Ramps equipped with means for hauling the trucks by power would have been an improvement, but did not appear to be suitable. Freight elevators or lifts appeared to be the proper type of equipment to install, particularly as the transit shed is of two stories. As the transit shed was already equipped with two marine freight elevators, it was decided to move these to locations so as to match the forward and after side ports and to install a portable marine elevator to serve the intermediate side port.

Since there was a railroad track along the wharf apron that had to be maintained, it was necessary to arrange the freight elevator equipment so that the track would not be put out of commission, and at the same time to carry the elevator platforms to the ship's side. This was accomplished by installing the main elevators entirely inside the transit shed and building in front of each elevator an adjustable section of wharf apron with a hinged steel plate platform at the outer end to reach into the side port of the ship. The adjustable section is raised or lowered by an electric hoist, and has a range of travel from 16-ft. below the wharf deck to 8-ft. above. When the elevator is not in use the adjustable section is raised or lowered to the



Bell Street Terminal. View along wharf apron showing portable elevator and side port, with adjustable apron section and loaded four-wheel trucks at after-side port and in background platform at elevation of upper floor of transit shed.

The Port of Seattle



Port of Seattle—continued

Hanford Street Wharf and Grain Elevator at left and Spokane Street Wharf and Cold Storage Plant at right.

level of the wharf apron, and the railroad track rails are then supported on steel beams resting in pockets in the wharf structure, on either side of the elevator well.

In operation the adjustable apron section is raised or lowered to the level of the ship's side port, the hinged steel apron swung down with the outer end resting on the deck just inside the ship and the main elevator then operated between the level of the adjustable section and the transit shed floors. Four-wheel dock trucks are used for transferring cargo from the ship through the side ports, up or down on the elevators and into the transit shed. Outgoing cargo is, in general, assembled on the lower floor of the transit shed and incoming cargo is deposited largely on the upper floor. This elevator equipment has proved to be very rapid and satisfactory in actual operation.

Just south of the Bell Street terminal lies the Lenora Street Pier, which has recently been acquired and re-built by the Port of Seattle. The south half of the pier was re-constructed to provide a modern terminal for the ships of the Canadian Pacific Railway that ply daily between Seattle, Victoria and Vancouver. Two berths were provided, one on the south side of the pier and the other at the west end. Each berth is equipped with a Barlow marine elevator for transferring automobiles and general cargo between ship and wharf through the side ports of the ships. For each berth there is also an adjustable passenger landing and ramp that leads from the ship to the customs' examination room on the second floor of the transit shed. From the custom's examination room the passengers pass to the large, well-lighted waiting room that is provided with every reasonable convenience for the traveling public. Outside the waiting room on the north side is an open plaza, where motor cars coming down the concrete viaduct along Lenora Street from uptown can turn, discharge, or pick up, passengers and then return up the viaduct. Luggage and freight are taken care of on the lower or main floor of the transit shed.

The north half of the pier is provided with a one-storey transit shed for handling general cargo of the ships using the berth on the north side of the pier.

The Stacy Street Terminal includes a slip or waterway 212-ft. wide and about 800-ft. long. On either side of the slip is a wharf and transit shed. A waterside railroad track is provided on the open apron in front of each shed and two depressed tracks at the back. At the shore end of the slip is a four-storey reinforced concrete warehouse. Two floors of this warehouse are equipped with thermostatically controlled heating

units that prevent the temperature from falling below a predetermined point. This provides proper storage conditions for tinned fruit. This terminal has been used to a considerable extent for the handling and storage of tinned salmon and tinned fruits, but general cargo is also handled through the transit sheds.

The Hanford Street Terminal is planned primarily for the receipt, storage and shipment of grain, both in bags and in bulk. Provision is also made for handling general cargo through the transit shed. The terminal includes a wharf that affords berthing space for three ships, a two-storey transit shed, a reinforced concrete grain elevator with a storage capacity of 1,500,000 bushels of grain, a sacked grain storage building and several smaller buildings.

Ample railroad trackage is provided to care for the cargo that passes through the transit shed, as well as the grain for the elevator. Grain is received by rail, passed through the working-house of the elevator where it is cleaned, scoured, washed, or treated in any way that its condition requires, and is held in the storage bins until shipped. Most of the grain goes out by ship and is transferred from the elevator to the ship by conveyor belts and spouts that discharge it into the hold of the ship. Loading of two ships can be done at the same time. Sacked grain is stored in a section of the transit shed and in a separate building provided for that purpose.

At the Spokane Street Terminal, in addition to the wharf that affords berthing space for three ships, there is a two-storey transit shed, a two-storey tinned salmon warehouse, a seven-storey concrete cold storage warehouse, an ice-making plant and a fish freezing and cold storage plant.

The wharf and transit shed are used for general cargo, but considerable space, particularly on the second floor, is ordinarily devoted to tinned salmon storage.

The large cold storage building has space for 15,000 tons of goods, or a net capacity of over 1,800,000 cu. ft. The space is divided into rooms, there being six storage rooms to a floor, except on the ground floor where there are a greater number of smaller rooms. Refrigeration is supplied by a direct expansion ammonia system, the pipes being in the storage rooms. The rooms are insulated and piped for different temperatures down to 12 degs. below zero Fahrenheit. This plant has been successful in the storage of dairy products, fresh eggs, berries, reindeer meat, nuts and other perishable products.

The fish freezing and cold storage plant is located to the west of the large cold storage building, with an ice storage house with a capacity of 5,000 tons of ice between. The fish

Port of Seattle



Pier 41 at left and Pier 40 in centre. Elevated reinforced concrete viaduct along Garfield Street with oil storage tanks and railroad yards beyond.



Stacy—Lander Terminal.

Port of Seattle—continued

plant includes cranes for handling fresh fish from the fishing boats, a washing and cleaning room, sharp freezers where the fish are quickly frozen hard, a dipping tank for glazing the frozen fish and storage space where about 2,500,000 lbs. of fish can be held in a frozen condition. Many varieties of fish are frozen and stored in this building, including salmon, halibut, herring, red snapper and cod.

The ice-making plant supplies ice to the fishing boats so that the fish can be packed in ice as soon as caught and kept chilled until the boat reaches the freezing plant. Ice is also supplied to refrigerated cars in which fish is shipped to interior points away from the coast.

Since Seattle lies in a great timber-producing district, it has proved economical to use this material in building the structures of the Port of Seattle. Except for the Bell Street warehouse, the Stacy Street warehouse, the grain elevator and the Spokane Street cold storage plant, the buildings are all of timber construction. The wharves are carried on creosoted fir piles, with timber caps, stringers and decking. The transit sheds are of heavy timber framing, with corrugated iron siding. In the newer buildings the runways are covered with asphalt paving in order to reduce the cost of maintenance and repairs, and to increase the speed of operation of the trucks. In general, the type of construction adopted for these terminals has proved to be economical and quite satisfactory.

In order to reduce the fire hazard and the cost of fire insurance all the buildings of the Port of Seattle are equipped with automatic sprinkler systems and other approved fire-fighting apparatus. This has resulted in very low insurance rates.

The quay wharf type of terminal has been used entirely, if the two piers at Smith's Cove and the Lenora Street pier are considered as two wharves placed back to back. In every case there is, on the water side, an open apron provided with one or more railroad tracks. For single ship length berths one track is ordinarily sufficient with a width of apron of about 20-ft. For a two-ship length berth, or longer, two tracks are required on an apron about 28-ft. wide, the tracks being connected by crossovers not farther apart than the length of a ship.

The transit sheds are largely two stories in height and vary in width from 70-ft. to 118-ft. The wider sheds are better adapted to economical operation under present-day conditions. All two-storey sheds are provided with one or more large freight elevators. The platforms of the elevators are long enough to allow one tractor truck and two or three trailer trucks to be elevated or lowered at a time. In order to

facilitate the handling of cargo between the ship and the second storey of the transit sheds, movable platforms at the level of the second floor are provided, which can be travelled along the open apron spanning the railroad tracks.

Back of each transit shed there are provided two or more railroad tracks, depressed so that the floor of the railroad car is flush with the floor of the transit shed. In most cases the tracks are paved so that motor cars can back up to certain transit shed doors and receive or discharge freight without entering the sheds.

The warehouses, in general, are located parallel to the transit sheds and separated from them by the depressed tracks. Bridges over the tracks at the second-floor level allow direct connection between transit shed and warehouse.

The ordinary movement of freight between ship's tackle and point of rest in the transit shed is by means of four-wheel trucks towed in trains of from two to four by gasoline-driven tractor trucks. In handling cargo in cases or boxes sling-boards the size of the truck bed are used. A loaded sling-board is lowered by the ship's tackle directly on the truck and an empty sling-board returned from another truck to the hold of the ship to be loaded. For a large part of the cargo handled at this port this proves to be a very economical system. Power-driven stackers and pilers are used where high piling is necessary. Trains of gravity rolls are also very often found convenient in handling certain classes of freight from railroad cars and the transit shed.

Two steam-driven locomotive cranes are kept ready to handle heavy lifts, and are also used in the repair and maintenance work. On Pier 40 there is a shear leg derrick with a lifting capacity of 100 tons. It is so situated that it can transfer heavy lifts between ship and freight car.

Ship repair facilities at the port are adequate. A floating dry-dock is located on Harbor Island on the south side of Elliott Bay, capable of lifting vessels up to 15,000 tons. At that point there are also shops well equipped to handle any kind of ship repair work. Many other repair shops are located around the harbour for doing specialised work.

Summarising, the port of Seattle is equipped to handle expeditiously and cheaply the ships that frequent the port, and to facilitate the transfer, storage and forwarding of cargo, as well as to care for passengers. The terminals are well planned, the buildings substantial and convenient, the fire protection features well cared for, and adequate, modern freight-handling equipment is available.

Launch of H.M.S. "Severn" at Vickers-Armstrongs, Ltd., Barrow-in-Furness

H.M.S. "Severn," a submarine of the River Class, was launched at the Naval Construction Works of Vickers-Armstrongs, Limited, Barrow-in-Furness, on Tuesday, January 16th, 1934, by Mrs. Forbes, the wife of Vice-Admiral C. M. Forbes, C.B., D.S.O., Third Sea Lord and Controller of the Navy.

Commander C. W. Craven, the Managing Director of Vickers-Armstrongs, who presided at the luncheon in the General Offices of the Works after the launch, in proposing the toast of H.M.S. "Severn," said that she was the 162nd submarine launched from the Barrow Works. After to-day's launch there would be two passenger ships, one cruiser, two destroyers and four submarines on the stocks at Barrow, and at the fitting-out wharf the Brazilian Training Ship and the submarine that had just been launched. That showed a very considerable improvement. It also showed a spirit of enterprise on the part of the board and management of the Company in securing the orders in face of very severe home competition for British work and International competition for the important contracts being executed for Portugal and Brazil.

When the "Thames" was launched in January, 1932, he appealed to the Controller of the Navy and his colleagues on the Board of the Admiralty to give very earnest consideration to anticipating, even by a few months, the placing of the Naval Contracts for that year, and similar appeals were made by many other managing directors of shipbuilding firms. These appeals were very sympathetically received, and the industry was grateful for the fact that orders for ships were now being placed earlier than was the case at that time. While he did not in any way wish to add to the Controller's difficulties by anything he might say, he could assure him that if the programme which would be approved by Parliament in early Spring could be ordered earlier in the year, it would have a wonderful effect on the shipbuilding industry of the country.

The industry had certainly had some encouragement lately. The announcement that the great Cunarder was to proceed and the orders placed by the Orient Company, the P. and O. Company, Shaw Savill, the New Zealand Shipping Company, the

Anglo-Saxon Company, the Eagle Oil Company, etc., would certainly do a great deal to relieve unemployment in the most distressed of all our industries. Even to-day, however, there must be about 75 per cent. of the berths in the country unoccupied, notwithstanding the fact that the total number of berths had been reduced considerably during the last few years, and approximately 50 per cent. of the workpeople were still unemployed.

Admiral Forbes said that a previous Barrow-built British Submarine bearing the name "Severn" had been taken over from their excellent friends and allies, the Brazilians, and did some very excellent work during the war. There was, therefore, that to bind the interests of the two peoples and navies in the launching of another British Submarine bearing the name.

When he went to the Admiralty the country and industry, especially the shipping industry, were at their lowest ebb. That was just after the time we went off the gold standard, and did other things of that sort at the end of 1931. The position to-day was improved, and he hoped that it would go on improving. His Majesty's Navy had been slogging along slowly, but had added to its fleets and flotillas better and more economical ships. For example, the "Thames," first ship of the class to which the "Severn" belonged and, like her, a Barrow product, had made a non-stop run from Portsmouth to Venice in seven days at an average speed of over 17 knots.

Admiral Forbes added, in conclusion, that he had been allowed by his colleagues on the Board of Admiralty to anticipate the official announcement of new contracts to the extent of saying that Vickers-Armstrongs, Ltd., would receive an order for two of the eight destroyers in the 1933 programme. He wished the firm the success which was its due as one of the greatest shipbuilding firms in the country.

In his reply to Admiral Forbes, Commander Craven said that he estimated that the order for the two new destroyers would mean an average of 2,000 British workmen being taken off the streets up and down the country for an average of two years

Port Reorganisation : A National Problem*

By FRANK BROWN, Member of the Institute of Transport†

THIS country is suffering in the matter of docks (as in many other directions) from the fact that it has been a pioneer. As a consequence, very heavy burdens are being carried in respect of capital expenditure on docks which are now "out-of-date." This is the result of fundamental changes, the principal being the increasing size of vessels during the last fifty or sixty years (and particularly in the last forty), the shrinkage in our overseas trade, and the changes in the character of traffic since the war.

All ports catering for overseas trade have found themselves obliged to incur new expenditure on larger docks, and it is probable that since 1890 the capital expenditure on dock undertakings has been more than doubled. There is now well over £200,000,000 of capital represented in docks, the interest on which, together with the heavy expenses of maintenance, has to be met in one way or another. Such a burden in years of normal or expanding trade must necessarily be heavy, but dock-owners have been faced for a long time with the problem of diminishing trade and the prospect of our maritime trade continuing far below its pre-war level.

Many ports have suffered a serious decline in their staple trades and the transfer of existing traffic, and development of new traffics, have called for new construction and facilities, whilst the question of obsolescence has become acute owing to the unsuitability of much of the older dock accommodation for present day requirements.

Without going too far back into history, what was the position during the nineteenth century when England was enjoying a maritime trade far in excess of any other nation? Here was a relatively small country with a long coast line offering numerous opportunities for dock works and shipping places; a keen local spirit of enterprise; a laudable ambition of every seaboard town to become the port for its hinterland and to compete for as much of its neighbours' traffic as it could secure, and a natural desire of merchants and manufacturers to carry inland traffic to and from the ports the shortest practicable distance.

These factors began to manifest themselves 150 years ago and received great acceleration 100 years ago with the development of steam and its concomitants—coal, railways, iron and steel, steamships and machinery. As a result Great Britain finds itself to-day the possessor of 15 to 20 ports claiming first class rank, and several hundreds of smaller harbours, wharves and shipping places. The Royal Commission on Transport in their report in 1931 summarise the ownership and management of docks and harbours of Great Britain under the following heads:—

(a) Local commissions or trusts, not working for profit, established under statutory authority	...	...	...	110
(b) Municipal authorities	...	...	...	70
(c) Railway companies	...	...	...	50
(d) Harbour companies or individuals	...	...	...	100

Of all the large ports it can hardly be said that there is a single one with a complete monopoly of trade except for a very circumscribed area, although London, and to some extent Liverpool, claim almost a monopoly in certain classes of imports and exports.

Each port, no doubt, has a few special trades which cannot, commercially speaking, be divorced from it; but many goods find their way into markets through other than the nearest ports. Bristol, London, Liverpool, Manchester, Hull, Goole, and to some extent Southampton and one or two of the Welsh ports, serve that vast belt of industrial country 50 miles wide and 100 miles long ranging from Worcester and Northampton in the south to Preston and Leeds in the north.

Another feature due to the pioneer character of these dock undertakings is that they were constructed and developed under greatly differing conditions (physical and economic), pursued different methods and customs, and resorted to various artifices to hold and develop their trade. Thus, Great Britain has from very early days had forms of dock ownership represented by municipal authorities, landowners, shipowners, manufacturers, public trusts, statutory companies, joint stock companies, and colliery proprietors. Later on, the railway companies became very large dockowners.

The variations in the different forms of ownership express themselves in many directions, viz., in facilities, rates of pay, dock dues on ships, and dues and handling charges on goods, labourage operations aboard and ashore, and probably the

greatest complication of all, the financial problem of the railway docks, supported as they now are, almost without exception, out of railway revenue. This particular problem has become more acute since the amalgamations under the Railways Act of 1921.

But there are many other difficulties and complications:—

(1) There are ports where the dock-owners employ no labour direct in the duties of loading, stowing or discharging vessels, or shipping or receiving goods. There are other ports where firms of stevedores do part of the work on board ship and part of the work on shore. There are others where some firms do only the "board" work and others only do the "shore" work. In other cases some dockowners perform some of the work ashore but none of the work aboard. Then there are cases where some shipowners employ direct labour for the labourage operations on their own vessels. In only one case, i.e., Manchester, does the dockowner possess and exercise the sole right of performing the whole of the operations within its own docks.

(2) At some ports charges have to be paid by the merchant for unloading from or loading into truck, and for use of cranes; at other ports he pays a part and the shipowner pays the rest. At other ports, again, the shipowner will pay the whole. There is thus no consistency in the incidence of costs as between shipowner and merchant.

(3) Another complication is that at some ports no dock dues but only conservancy charges are imposed on goods which pass overside between steamer and barge. London and Hull are examples of this. In other cases dock dues are charged but not conservancy rates. In one port, traffic is handled in one way by one class of machinery; in another port, not far away, there is another and quite different practice, due partly to custom, and partly to the volume of trade available.

(4) In many ports the merchants or the manufacturers have their own wharves in contact with their warehouses, works or mills, and provide their own machinery or gear, such as in the flour milling industry, or the iron and steel industry.

But probably in no direction is there so much confusion and differentiation as in the fixation and division of railway rates and dock charges, or in the charges or the services performed in regard to docks and dock railways by railway companies and dockowners respectively. For example:—

(1) At some ports the railway rates cover the conveyance of traffic to and from ship's side. At others, it is claimed that the railway rates only cover the journey down to the companies' junctions with the dock lines. In other cases it is argued that the railway rates cover the railway journey not only to the dock side but also the services of shipping and stowing goods; or, in the reverse direction, of discharging from the ship's hold and receiving into truck.

(2) At some docks, allowances are made to traders by the railway companies out of the railway rates for services not performed, or accommodation not provided.

(3) Traffics to and from towns in one area obtain allowances under this arrangement, whilst the traffics to and from towns in another area served by the same port do not.

(4) At another port the allowances are given, not to the trader, but to the port authority, which is able thereby to cover the whole or a large part of the costs of its railway accommodation and services within the dock boundary, and relieve the trader of the whole or part of the dock charges. This method may apply to one part of the same port and not to another, and it may be that one range of allowances will apply to exported goods, whilst another will apply to imported goods.

(5) Allowances and charges at docks may also vary according to the area to or from which the traffic passes. A port authority having the status of a railway company is enabled to sink part or the whole of the dock charges in through rates.

The merchant or manufacturer, or shipowner, who is not doing continually a large business is naturally bewildered by the confusion and lack of uniformity in the charges and practices at the different ports.

But all these variations in practice have a deep economic significance and effect. The national aim must be in the direction of higher efficiency; it should work in the direction of reduction in transport costs, and the discouragement of long journeys by rail, road, or canal where shorter journeys could be substituted. It is as obviously undesirable, for example, for

* This paper appeared in the Journal of the Institute of Transport for January, 1934, and is reproduced by their kind permission.

† Contribution awarded the Dock and Harbour Gold Medal, 1933, donated by the Dock and Harbour Authorities Association.

Port Reorganisation—continued

traffic which is in general demand to be imported into London and sent down to the West of England or South Wales, as it would be for such traffic to be imported into the Bristol Channel and despatched to London. Yet this is happening daily under present conditions.

It is tempting to a railway man to take the narrow or short view, and to say that long transits are good for the railways; so they would be if they did not represent thoroughly unsound economics, and were not bad nationally and industrially, and eventually inimical to the interests not only of the public, but also the railways themselves.

Another important factor is that there is nothing much more conservative than a market, or the instincts and habits of merchants; and one must recognise the power and interests of those who finance our trade, both import and export.

Still another factor is that the steamship lines which have to a large extent through their conferences agreed as to services and freights on a large part of the general and miscellaneous trade of the world. There is nothing wrong or sinister in these conferences. They are natural and proper and in accordance with primary business instincts, but it remains to be seen whether or not national needs can be served by fundamental changes—and this without prejudice to shipping and merchants' interests, but rather to their advantage.

This problem of docks and their relations to ships and railways and to overseas trade generally, is one of paramount importance. It is one of such far-reaching consequences that it warrants a departmental committee—or even a Royal Commission—of its own, with power to probe into all these peculiarities and customs, and difficulties, and anomalies, and into the influences affecting the routing of overseas trade.

The Royal Commission on Transport in their final report (C.M.D. 3751 of 1931) touched upon this question of docks. They had comparatively very little evidence before them, and though they indicated in their report the presence of difficulties, and suggested some admittedly possible remedies, as a whole they skated very delicately over thin ice. They knew neither the thickness of the ice nor the depth beneath.

Let us see what the Royal Commission on Transport had to say. Their terms of reference were so wide, embracing every form of transport (but especially railway and road transport) that it was not to be expected that they could devote sufficient time to enquire into the special problems and difficulties of the ports—or at any rate not time enough to enable them to make a firm and definite announcement in favour of fundamental changes.

The following extracts from the report on the question of ownership of docks are, however, of considerable interest:—

"We have devoted no little attention to the subject of the ownership of harbours—particularly by railway companies, who own about fifty harbours, some of them large and important." (Paragraph 475) . . .

"Evidence has been submitted to us that the ownership of docks and harbours by railway companies is undesirable." (Paragraph 476) . . .

"We have very carefully considered this evidence, and we are definitely of opinion that, in principle, it is undesirable that one form of transport should own docks and harbours to which access is essential by other means of transport. We are further of opinion that the best kind of authority to own docks and harbours is a Public Trust, such as exists in London, at Liverpool, on the Clyde and elsewhere. Moreover, it would appear to be greatly to the public interest that such Trusts should not be confined to single ports, but should control all the harbours in a particular district." (Paragraph 479).

"When, however, we consider the character of the great majority of the railway-owned docks and harbours, we are not at all certain that it would be to the advantage of the public that they should be transferred from their present ownership, which in some cases only dates from the passing of the Railways Act. A certain number of them are nothing more than links or stepping stones from the railway to the steamboat, and were established by the railway companies for this purpose. . . ."

"They are really almost in the nature of railway stations, and we are not aware that there is any difficulty of road access to them." (Paragraph 480).

The following are extracts from the Royal Commission's "Summary of Conclusions and Recommendations"—

"(lxxxvii) With minor exceptions, the harbours of Great Britain are in the hands of (a) local commissions or trusts, not working for profit, established under statutory authority, or (b) municipal authorities, or (c) railway companies, or (d) harbour companies or individuals."

"The principal commercial harbours are under trusts for railway companies."

"(lxxxviii). The efficiency of many of the undertakings controlled by Public Trusts cannot be denied."

"The same remark applies in no less degree to many of the municipally-owned and railway-owned undertakings."

The Royal Commission clearly exhibited a leaning towards the idea of the formation of port groups; but they were not prepared to recommend that the existing railway-owned docks should be divorced from the railways.

An outstanding and recent illustration of the dock grouping exists, of course, on the Thames. After a long and troublesome history of internal competition, accompanied by confusion, strife, and comparative inefficiency amongst the separate dockowners (naturally resulting in common adversity), the Port of London Act of 1908 was passed, following the recommendations of a Royal Commission. There is no gainsaying that this measure has met with remarkable success. There has been a great extension in the dock accommodation, and a marked improvement in facilities and despatch.

Evidence was submitted to the Royal Commission on "port grouping," indicating separate groups for the Humber, the N.E. Coast, the Firth of Forth, the Clyde, the Mersey and the Bristol Channel.

What chance has such a scheme of coming into operation? It is, of course, difficult to conjecture. It means a general and fundamental change of ownership; and apparently involves the divorcement of the railway-owned docks and the municipally-owned docks from their present ownership.

One must doubt the possibility of such a scheme being brought about by agreement. Local interests, aspirations, prejudices and—(what is also perfectly legitimate)—local pride—will on the whole be opposed to absorption schemes. If such a scheme comes about it must be as a national conception, and to serve a national end.

The view has been expressed above, that present-day dock problems require a Royal Commission to themselves; and to indicate the scope of the problem and opportunity the writer has endeavoured to draft terms of reference:—

To enquire and report on:—

- (1) The construction, organisation, working and equipment of the principal docks, harbours and wharves of the country.
- (2) The bases of rates, charges, conditions and methods by which trade is dealt with at the ports, whether arriving or departing by rail, road or craft.
- (3) The services rendered respectively by railway companies, road or water transport companies, dock authorities, and labourage contractors; and the charges respectively made, and the composition and apportionment of such rates.
- (4) The relationship generally between railways and
 - (a) Railway-owned docks, and
 - (b) Non-railway-owned docks,
 in so far as accommodation, services, charges, apportionment and accountancy are concerned.
- (5) The present channels through which trade flows between the ports and inland areas and to consider to what extent it could be encouraged to flow along shorter and cheaper routes.
- (6) Whether the efficiency of the ports could be increased by work being performed over a longer period of the day, rather than by an extension of capital expenditure on additional works.
- (7) By what means the quotation of railway and dock charges on overseas traffic could be simplified and unified.
- (8) By what measures, if any, of amalgamation, or grouping, the ports of the country could be rendered more efficient and economical in the national interest.
- (9) The best form of ownership of docks in the public interest.
- (10) The possibility of the greater concentration of bulk traffics and the provision of special equipment therefor.
- (11) What further safeguards, if any, are necessary or desirable to ensure—in the public interest—equality of treatment and opportunity for docks in their relationship with railway, road and canal services.

In considering the various forms of ownership it is interesting to look at the returns on dock capital expenditure during the last three financial years.

	Per cent. return on docks capital expenditure		
	1930	1931	1932
London	4.04	3.46	3.75
Liverpool	4.51	3.76	3.79
Manchester	3.52	3.22	2.84
G.W.R. Docks	1.93	.82	.73
L. & N.E.R. Docks ...	8.3	.36	.21
L.M. & S. Rly. Docks (Dr.)	.65 (Dr.)	.79 (Dr.)	.84
Southern Rly. Docks	3.78	3.38	2.68
Bristol	3.18	3.21	3.62

Port Reorganisation—continued

With the grave losses occurring at the coal and iron docks, local authorities of South Wales and the North-East Coast are not likely to welcome municipal ownership, as this would throw on the community a burden which trade should at least share.

On the other hand, the railway companies have a natural and instinctive tenacity, and—unremunerative though their dock properties appear at the moment to be—they are not likely to relinquish their ownership voluntarily except as part of a scheme in which their financial and traffic interests were adequately safeguarded.

If port grouping is to come it will be as a matter of national expediency and conceived on the same lines as the railway amalgamation of 1921.

It is common ground that the Railways Act of 1921 has so far been but a partial success, though sufficient time has not elapsed for its full benefits to fructify, and conditions have militated against a fulfilment of anticipations. It may be presumed that a port grouping scheme would be framed on commercial lines, i.e., the formation of a trust on which representatives of trade and commerce, local authorities, transport and labour, would appear under a carefully balanced representation.

The line of demarcation between railways and docks would have to be clean cut and there would have to be definite legislation in regard to the relationship between the railway companies and the dock authorities.

Another alternative is, obviously, railway ownership. It may be urged that if the whole of the docks of the country were taken over by the railway companies, a great step forward would be made in the direction of the best and co-ordinated use of railway and dock facilities. This presupposes three things:

- (1) An abolition of any competition between the railway groups for overseas trade.
- (2) A satisfactory assurance that road transport and coastwise transport would have equal and adequate facilities as a matter of public interest.
- (3) An unification of the railway companies in the form of a public trust.

The intense struggle between the railways and road transport has certainly led to national feeling that there is both room and need for equalizing the conditions under which the respective services operate. In a broad sense this feeling finds expression in the proposals of the Road and Rail Bill and Finance Bill of the present session, but the same causes have tended to develop opinion along the line that railways should confine themselves primarily to actual transportation of traffic, and should divest themselves of such ancillary services as docks, steamboats, hotels, etc., most of which are a burden on railway revenue.

This point of view was developed, for example, during the debate in the House of Lords on April 12th, 1933, in connection with the manufacture of rolling stock, and is in line with the argument that owners of docks should not be more concerned with one form of inland transport than another; in other words that rail, road and water should, as a matter of general policy, be assured of equality of opportunity. In these circumstances it is difficult to imagine all docks becoming railway owned, for this would involve great trusts and corporate bodies like the Port of London, Mersey Docks and Harbour Board, Clyde Navigation, Manchester Ship Canal, the Port of Bristol Authority, and the Leith Harbour Commissioners, losing, not merely their identity, but the benefits which spring from the co-ordinated effort of local interests.

Enough has been said to indicate the wide range of problems that face those who set out to re-fashion and co-ordinate the activities of the harbours and docks of the country—that vital link between land and sea transport.

Those most intimately concerned with docks know the complexity and confusion in matters of charges and services that exist between (a) dock and dock, (b) dock and trader, and (c) dock and transport by land and sea. The task is overdue for treatment. Courageously, thoroughly and patiently tackled in the national interest there is the certainty of great reward, a smoother and more economical working of the dock machine, greater facility, despatch and economy in distribution, and a simplification of methods and charges which cannot fail to commend itself to the whole commercial community, and greatly stimulate what we as a nation depend on for our well-being—our maritime trade.

The grave and urgent problem of port reorganisation is admittedly only a part of the still larger problem of transport as a whole, and transport is in turn an essential feature of national and international economics. World reactions are inexorably causing changes in long established conditions. The problem of "road and rail" is at this moment (May, 1933) before Parliament. Even if the Road and Rail Bill provides a solution of that particular problem, it only means one step in the progress towards further reorganisation and co-ordination of our railways, roads and other transport services.

This progress seems certain to continue, and if so we are definitely and of necessity moving forward towards a change in the matter of port ownership, direction and administration. It is better that great systems and organisations change slowly; haste defeats its own purpose, for human nature and habit make conservatives of us all.

The present generation of its own experience knows the hardship and adversity that have arisen from rapid changes in conditions. Wartime and post-wartime conditions, with their violent disturbances of trade and industry, and injury to the delicate fabric of international exchange, have been accompanied by great hardship and distress throughout the world. Change has been too rapid. One generation should not be called upon to sacrifice too much happiness, comfort and well-being in the hope of accelerating the arrival of benefits for the next generation.

As one practical illustration of too rapid change, millions of people in this country dependent on coal for their livelihood are suffering adversity by the phenomenal development during a short space of time of new coalfields abroad and the substitution of other means of generating energy.

Our railways, however, are passing through the various stages with greater deliberation, thus minimising hardship on the employees.

In 1921 there were 60 separately administered railway undertakings. The Act of that year reduced them to four. The economies in staff and the stagnation in promotion, severe as they have been on railwaymen of all grades, would have been still more serious if the transitional stages had been shortened. Loss of trade and common adversity have forced what is virtually a common policy and a unifying of interests, as expressed in the far-reaching pooling schemes recently sanctioned by the Minister of Transport under the Railways Act of 1921.

The actual unification of the railways into one public company or trust is, in the opinion of many, only a matter of time. There are innumerable further economies which could begin the moment all four railways became one undertaking; for example, the elimination of duplicate and over-lapping staffs of all grades, the reduction in the number of receiving offices, the cessation of the elaborate Clearing House machinery for the apportionment of rates and fares, and the discontinuance of duplicate services. But it is at once apparent that all these forms of economy involve further displacement of labour, and a reduction in the opportunities for employment, and although *prima facie* the result might be gratifying from an expenditure point of view, too rapid introduction of such methods might prove inimical, not merely to individual, but also to national interests. The time has passed when labour is content to be regarded as a mere factor of utility in the national machinery, and be absorbed or discarded at will. The human factor has properly become of increasing importance.

The experience in the matter of railways is applicable also to the principal ports of the country. The welfare of every port community is largely bound up with the volume and value of its maritime trade, and violent disturbances and serious diversion of the channels of trade must be harmful to local interests. Hence advantages of reform may be more than offset by hardships caused by diversion of trade unless properly controlled.

Reform, therefore, must be gradual, deliberate and by stages; somewhat perhaps after the manner of the railways themselves, which by numerous amalgamations and absorptions reduced hundreds of separately authorised railway companies down to about sixty active ones in 1921, and then to four, as has been stated.

There is another feature which must be borne in mind in connection with port re-organisation. By the very nature of the enterprise it is more linked up with local activities and interests than is the railway. Practically every port in the country—large or small—discloses this feature. In all cases the large ports are really an aggregation of interests—dock-owners, shipowners, merchants, shipping agents, forwarding agents, stevedores, tugowners, bargeowners, importers, exporters, warehousemen, and hundreds of grades of local labour; and the well-being of the port largely depends on the degree of success with which these multifarious activities are co-ordinated and enabled to work with smoothness and in mutual support.

A further most essential feature is to preserve as long as possible the initiative which springs from pride in local tradition and prestige, and from the incentive of equitable forms of rivalry and competition. Inasmuch as a port community is so largely dependent on the port's activities, it is fitting that the community itself should assume an interest and accept a responsibility in the port undertaking. This principle finds expression in its most complete form in cases like Bristol and Preston, where the whole of the docks expenditure forms part of the ordinary loan capital of the corporation. In the case of Man-

Port Reorganisation—continued

chester, London, Liverpool and Glasgow, the local communities have a very large stake, but in addition capital has been provided by merchants, manufacturers, traders, and shipowners as well as the general public.

Non-railway docks represent something like £160,000,000 of capital, the greater part of which is represented by:—

	£
London (Port of London Authority)	39,900,000
Liverpool (Mersey Docks and Harbour Board)	44,200,000
Manchester (Ship Canal Company)	20,200,000
Glasgow (Clyde Navigation)	12,000,000
Bristol (Bristol Corporation)	8,500,000
Newcastle (Tyne Commission)	7,700,000
Belfast (Harbour Commission)	3,700,000
Leith (Harbour Commission)	2,600,000

The capital of railway-owned docks is about £68,000,000, made up as follows:—

	£
London & North-Eastern	25,190,000
Great Western	21,110,000
London, Midland & Scottish	10,175,000
Southern	11,540,000

This £68,000,000 forms part, of course, of the general capital (£1,200,000,000) of the railways, and thus cannot be said to be identified with local authorities or local enterprise as in the case of the non-railway-owned docks.

Even before the war this country was open to the charge that it was over-equipped in the matter of docks. In the provision of docks the proportion of capital for accommodation and equipment is probably higher in relation to turn-over than in any other industry, yet whereas railways, factories, mills and other similar industrial enterprises keep at work in normal times for a very large part of the 24 hours, the processes of loading and unloading at docks go on for only about 25 per cent. of that time; that is to say, 44 hours per week out of 168.

Extra working time is discouraged by reason of the heavy overtime charges involved.

The shipment of coal proceeds normally for a larger part of the day than general cargo, but at its best, still occupies only a small part of available time.

Lack of tonnage resulting in vacant berths also increases the difference between potential and actual efficiency.

In 1913, when trade was at its peak, the potential capacity of our ports was far in excess of the volume of business offering; since then more docks have been built, and more docks are being built; equipment has been and is being improved at heavy cost. The potential capacity of our ports to-day to load and discharge cargoes is much greater than in 1913, yet the maritime trade has fallen greatly. Docks capital expendi-

ture has been piled up to too high a figure, and it is extremely difficult to see how the public interest can be served by further increases (except, perhaps, in isolated and special cases) of the capital burden.

Whenever there was a boom in trade and a period of high pressure at docks it was the practice for trading interests to call for further accommodation and facilities. Money was spent without fully appreciating that interest and maintenance charges have to be borne somewhere by somebody, and ought to be borne by the trades which the facilities are intended to serve.

The wide gap between the potential capacity of our ports when efficiently worked and the available volume of trade—present and prospective—forms the largest of the problems to be solved in port reorganisation.

What may we hope to gain by a full examination of our port system by a Royal Commission or departmental committee? Whether the next stage is the grouping of ports by estuaries, the transfer of all ports to railway ownership, or the formation of one public trust for all ports, or whatever the nature of the change in constitution and organisation, the one consideration which should over-ride all others is the public interest viewed nationally.

The objects may be summarised as follows:—

(1) The discouragement of such competition as takes merely the form of diversion of trade without public advantage.

(2) The co-ordination of port activities so as to minimise conflicting services and ensure that the whole machine may work more smoothly, economically and efficiently.

(3) The simplification of charges both in respect of dues on ships and goods, as well as for the processes of loading and unloading, the straightening out of the tangle between railway rates and services, and dock rates and services.

(4) The better provision for the amortization of capital represented by obsolete or obsolescent dock accommodation and facilities.

(5) The encouragement of traffic to flow—as far as other economic factors permit—along natural channels.

(6) The elimination, in the interests of trader and dock worker as well as the public, of customs and practices which are restrictive and inimical to the efficient and economical conduct of business.

(7) The provision of scope for the incentive and enterprise of local interests—traders, merchants, shipowners, ancillary dock services and local authorities.

Finally, it must be emphasised that any policy must work gradually and steadily towards the appointed goal, namely, the creation of an efficient port system serving truly and well the national interest; and it must be based on long range views.

Lloyd's Register Shipbuilding Returns for the Quarter ended 31st December, 1933

THE statistics issued by Lloyd's Register of Shipping regarding merchant vessels under construction at the end of December last show that in Great Britain and Ireland there is an increase of 27,779 tons in the work in hand as compared with the low figures for the previous quarter, and that the present total—331,541 tons—is 106,044 tons greater than the tonnage which was being built at the end of December, 1932.

At the end of December the tonnage on which work was suspended amounted to 145,122 tons—about 139,000 tons of steamers and 6,000 tons of motor ships. These figures include a 73,000-ton steamer on which work is expected to be resumed almost immediately. The total of the tonnage now on the stocks continues the steady increase which has been observable since the beginning of last year.

About 71,000 tons—21 per cent. of the tonnage now being built in this country—are intended for registration abroad or for sale.

The tonnage now under construction abroad—425,736 tons—is about 27,000 tons less than the work which was in hand at the end of September, 1933, and is the lowest total recorded for abroad since June, 1909. Tonnage, included in the total in hand abroad, on which work has been suspended amounts only to 1,465 tons of steamers and 25,653 tons of motor ships.

The five leading countries abroad are: Japan, 106,760 tons; France, 90,656 tons; Sweden, 64,640 tons; Holland, 40,540 tons; and Spain, 35,724 tons.

The total tonnage under construction in the World amounts to 757,277 tons, of which 43.8 per cent. is being built in Great Britain and Ireland, and 56.2 per cent. abroad.

In Great Britain and Ireland, 74,701 tons were commenced during the last three months, showing an increase of 35,031 tons over the corresponding total for the September quarter. During the quarter ended December, 1933, 65,274 tons were launched in Great Britain and Ireland, an increase of 23,197 tons as compared with the September quarter. Similar figures

for abroad are 69,960 tons commenced, and 109,664 tons launched, showing a decrease, as compared with the previous quarter, of 1,142 tons in the tonnage commenced, and an increase of 19,431 tons in the tonnage launched.

Oil tankers under construction in the world amount to 19 vessels of 117,608 tons, of which 5 vessels of 31,026 tons are being built in Great Britain and Ireland, 6 vessels of 41,100 tons in Sweden, 2 of 19,200 tons in Japan, 5 of 18,212 tons in Spain, and 1 of 8,070 tons in Denmark.

Of the 331,541 tons under construction in Great Britain and Ireland at the end of December, 112,276 tons consisted of motor ships, while at the same date the motor ship tonnage being constructed abroad (305,978 tons) was 188,490 tons in excess of that of the steamers.

The vessels being built in the world at the end of December include 1 steamer and 8 motor ships of between 8,000 and 10,000 tons each; 7 motor ships of between 10,000 and 20,000 tons; and 2 steamers (of 73,000 tons and 68,000 tons respectively) and no motor ships of 20,000 tons and upwards.

The table respecting marine engines shows that the horsepower of steam engines now being built or being fitted on board amounts to about 552,000 h.p.; these figures include 29 sets of turbines of about 466,000 shaft horse-power. The horsepower of the steam reciprocating engines (about 86,000 h.p.) amounts to 7.3 per cent. of the total horse-power of marine engines now being built in the world. The figures for oil engines aggregate approximately 621,000 h.p.

Tonnage to Lloyd's Register Class.—Of the reduced amount of shipbuilding in hand throughout the world, the tonnage being built under the inspection of Lloyd's Register at the end of December amounts to 557,032 tons. Of this total 319,322 tons, representing more than 96 per cent. of the tonnage being built there, are under construction in Great Britain and Ireland; while, of the tonnage being built abroad, 237,710 tons, or nearly 56 per cent. of the total, are being constructed under the inspection of Lloyd's Register.

Notes from Far Eastern Ports

Colombo Port Commission.

At a meeting of the Colombo Port Commission held recently a letter dated November 11th, 1933, was considered from the Director of Public Works regarding the estimated cost of the scheme for the extension to the approach bridge at the Passenger Jetty. After discussion it was decided that the matter be further considered in January, 1934.

A letter was also tabled from the Chairman, Board of Quarantine, regarding the services of the Port Surgeon on board ships. Dr. R. Briercliffe, Chairman, Board of Quarantine, explained that the Ministry of Health had decided some time ago that on the appointment of full-time medical officers private practice by the Port Surgeons should cease. He regretted that, in this instance, the notice of the change was inadequate and undertook to give longer notice of any such changes in future.

It was agreed that the change would ultimately benefit the shipping companies by (a) enabling economical arrangements to be made for medical attendance on board ships; (b) obviating the recurrence of complaints of high charges of such services, and (c) providing a better Port Health Service.

Ceylon's Customs Returns.

Ceylon's Customs returns for November support the view that the economic situation is definitely improving. The "turn in the tide" is also indicated in the increased immigration of estate labourers from India. Exports of domestic produce in November were valued at Rs. 16,360,884, as against Rs. 14,956,378 in the previous month, Rs. 11,381,787 in November, 1932, and Rs. 16,819,290 in November, 1931. The total for the last month is only about Rs. 90,000 below the second highest figure for the year reached in August last.

Imports were valued at Rs. 16,190,481 as against Rs. 12,596,453 in November, 1932, and Rs. 16,546,971 in November, 1931.

The revenue from Customs duties for October amounted to Rs. 3,683,243, import duties yielding Rs. 3,345,368.

Cochin's Port.

In spite of the unparalleled depression that is now prevailing, the Port of Cochin, on the Malabar Coast, has been steadily developing. Ten years ago ships taking cargo at Cochin, had to lie two or three miles off the coast, and had to do all their loading and discharging from lighters towed out to them. In other words they could work cargo in fine weather.

To-day Cochin boasts a perfectly sheltered harbour, approached by a well-buoyed, deep channel, and ships can now tie up to buoys a few hundred yards away from the wharves, and load and discharge in all weathers. This new port is still forging ahead. The Port Conservancy Board have decided that a fourth Harbour Master is required to cope with the increased trade. Further development of the harbour will shortly be commenced, and at the present rate of progress, in a few years time ships will be able to go straight alongside well-constructed wharves.

Compared with many of the other Malabar ports, Cochin cannot claim to be a really ancient port, as we are told, says a writer in the Calcutta "Statesman," because it was not a place of any trade previous to the Fourteenth Century. But on the other hand, Cochin was an important port when such places as Calcutta and Karachi were almost unheard of.

According to early writers, in the year 1341 an exceptional flood occurred, which produced great alterations in the coast at Cochin and opened up a capacious estuary. The port certainly played an important part throughout the early part of the Portuguese invasions. At that time Cochin was subordinate to Calicut, though apparently there was little love lost between the local Rajah and the Zamorin of Calicut.

We are told that after Vasco da Gama had returned from his first discovery of India, a second expedition was sent out under the command of Pedro Cabral. The latter, like Vasco da Gama, first visited Calicut and commenced establishing a trading station there. But those of his men who were on shore were attacked and massacred, only a few escaping to the ships. Cabral retaliated by sinking all the local craft and heavily bombarding the town. He then proceeded to Cochin, where he was received with every sign of hospitality. There the Portuguese were allowed to establish a trading depot and load their ships in peace.

Da Gama, on his second voyage to India, visited Cochin. On this occasion he was warned by the friendly Rajah that the Zamorin of Calicut, with a fleet that outnumbered Da Gama's by about ten to one, was waiting to attack him. Da Gama at once put to sea and with the aid of his superior gunnery completely defeated his opponents. This was the first of many conflicts the Portuguese were to fight in these waters, but had

it not been for the Rajah of Cochin's timely warning, the result might have been very different; as the Zamorin undoubtedly hoped to surprise the Portuguese while they were loading their ships.

Not long afterwards Portugal was able to repay some of the debts she owed Cochin, as Albuquerque considerably strengthened the defences of the Portuguese factory, and for some years afterwards Cochin remained the headquarters of the Portuguese in India.

During the 17th Century the Portuguese power in the East practically died out, and by 1660 Cochin had passed into Dutch hands. At the end of this Century the famous Captain Kidd is reported to have visited Cochin and to have captured three valuable Dutch prizes.

The future of Cochin should be every bit as interesting as its past, and many of us may live to see the day when once again this port will take her place as one of the most important trade centres of India.

Bombay Port Trust.

At a meeting of the Trustees of the Port of Bombay held on 5th December, 1933, the following tenders were accepted:—

Messrs. Madhavlal and Co., Ltd., for the supply of 34,000 tons Kusunda Nyadee steam coal for Port Trust requirements during the year 1934-35.

Messrs. F. Harley and Co. for the supply of 300 unproofed flax paulins for docks requirements during 1934-35.

Messrs. Alcock, Ashdown and Co., Ltd., for the construction of a 30-ft. Diesel-engined motor launch for harbour and pilotage duties in replacement of the s.l. "Jean" which has been over 30 years in commission.

Subject to the sanction of the Government an amendment of the Docks By-Laws was approved modifying, on the lines of the new Home Office Regulations, the existing restriction placed on the landing of cylinders containing gases and liquids under pressure unless packed or covered with coir or other specified envelopes.

* * * *

At a meeting of the Trustees of the Port of Bombay held on 19th December, 1933, the following were the main items of business disposed of:—

An expenditure of Rs. 10,000 was sanctioned for repairs to the Victoria Dock Main Entrance Gates.

A contract for the supply during 1934 of approximately 16,000 gallons petrol was placed with the Indo-Burma Petroleum Co., Ltd. The tender of Messrs. Balmer, Lawrie and Co., for the supply of galvanised iron sheeting for renewing the roofs of certain Victoria Dock and Grain Depot sheds was also accepted.

* * * *

At a meeting of the Trustees of the Port of Bombay, held on 2nd January, 1934, the following expenditure estimates were approved:—

Rs. 31,800 for encasing in cement concrete the rolled steel columns of A, B and C Warehouses, Alexandra Dock.

Rs. 3,255 for additional water connections at Ballard Pier to double the supply available for shipping berthed at the pier.

A reduction of Rs. 2 per 1,000 gallons was sanctioned in the charge for water supplied by Port Trust water boats to shipping at Ballard Pier and the Harbour Wall berths.

Amendments of the B.P.T. Railway Goods' Tariff were sanctioned to provide for (1) abolition of the B.P.T. Railway through freight charge of Rs. 5 per wagon on charcoal booked to or from Coal Depot; (2) the levy of an unloading charge of one pie per maund on consignments unloaded by the Port Trust at the Public Siding at Grain Depot.

Lower Port Dues at Danzig

In pursuance of the agreement concluded on the 18th September, 1933, between the Polish Government and the Senate of the Free City of Danzig, the Council of the Port and Waterways of Danzig, has lowered the tariff of port dues, as from 1st November, 1933, by 30 to 60 per cent., in order to conform with the tariff of the Port of Gdynia.

This reduction amounts to about 50 per cent. in the case of ship dues, to 65 per cent. for pilotage, and 20 to 50 per cent. for dues on goods. The rates charged for the employment of handling equipment and for the use of public stores and warehouses have been lowered from 15 to 40 per cent.

Further particulars may be obtained on application to the Port Council, Neugarten 2/29, Danzig.

The Port of Dublin

Port and Docks Board Election

Mr. David Coyle, T.C., presided at the first meeting of the Dublin Port and Docks Board, following the annual elections.

Mr. E. H. Bailey, Secretary, announced the result of elections, as follows:—

SHIPPERS.			
1.	Mr. J. M. Irwin (outgoing) ...	3,245	votes
2.	Mr. David Barry (outgoing) ...	3,168	"
3.	Mr. D. Twohig (new) ...	3,124	"
4.	Mr. E. D. Betson (new) ...	3,010	"

TRADERS.			
1.	Mr. P. McGrath (outgoing) ...	3,950	votes
2.	Mr. J. J. Halpin (new) ...	3,478	"
3.	Mr. T. O'Connor (new) ...	3,075	"
4.	Mr. P. J. Munden (outgoing) ...	2,947	"

These were elected to fill the eight vacancies.

Mr. Bailey welcomed the re-elected members and the new members.

Mr. Hewat proposed that Mr. T. F. Laurie be elected chairman as the person most acceptable to all parties. The normal practice, he said, was that the vice-chairman should succeed the chairman. There was no more respected member of the Board than Mr. O'Kelly (vice-chairman), but Mr. O'Kelly had expressed a wish not to go forward.

Mr. McGrath seconded the motion that Mr. Laurie be elected chairman.

Mr. Baird, retiring Chairman, supported the motion, and praised the business qualities, tact and ability of Mr. Laurie. A better selection could not have been made.

Mr. D. Healy, T.C., thought that the principle of seniority should be adhered to. Mr. O'Kelly might have been persuaded to change his mind, but in the circumstances, he would support the motion.

Mr. Coyle supported the motion, which was carried with acclamation.

Mr. Laurie, in returning thanks for his election, said that he could only succeed in his office with the co-operation of the members, and he was glad to know he would have it. They must be very jealous of the interests of the port, and work together as a body to ensure its successful maintenance as a first-class port.

Mr. David Barrie, O.B.E., proposed Mr. Chas. O'Kelly as vice-chairman. Mr. Coyle seconded.

Mr. O'Sullivan, in supporting, remarked that a Corporation representative never seemed to be proposed for these honorary offices, and added that next year they might be prepared for a nomination from the Dublin Corporation.

The motion was adopted.

The Chairman proposed a hearty vote of thanks to Mr. Walter Baird, the retiring Chairman.

Sound Financial Position

Mr. Hewat seconded, and the motion was carried.

Mr. J. M. Irwin, in support of the motion, referred to the able work done by Mr. Baird during the period of the Eucharistic Congress, and said that at all times Mr. Baird had shown tact and efficiency in the conduct of the Board's affairs.

Review of Port's Trade.

Mr. Baird, in replying, referred to the importance of the Board's work in the Irish Free State, and said that that fact was shown by the following particulars:—

Tonnage upon which dues were paid:—Cross Channel, 1,483,926 tons; decrease, 242,251 tons. Foreign, 946,356 tons; increase, 181,329 tons. Total, 2,430,882 tons; net decrease, 60,922 tons.

Tonnage dues collected:—Cross Channel, £40,132 3s. 4d.; decrease, £6,677 9s. 4d. Foreign, £35,310; increase, £8,714 1s. 7d. Total, £75,442 3s. 4d.; net increase, £2,036 12s. 3d.

Dues on goods, £79,774 2s.—a decrease of £237 8s. 6d. Surplus, 1932—£4,700; 1933—£5,900.

Mr. Baird went on to say how pleased he was to leave the chair with the Board in a sound financial condition. He thanked Mr. Hewat for advice and assistance, the outcome of which was a most satisfactory financial state of affairs. Their stock had been issued at £87 at 5 per cent., and those who had it to-day could sell it at from 106½ to 108, but if they took his advice they would hold it.

The Board was carrying out work totalling up to £100,000. Some of it was completed, and some of it was in progress, with the view of maintaining Dublin as a first-class port. The principal works were—The George's Dock—part renewal of inner and outer gates and sills; the new inner dock bridge, which was completed; the new George's outer bridge—the first half was completed and open for traffic; second half under construction; the conversion of the disused generating station to the transit shed; the completion of the six-ton electric cranes at the graving dock; the conversion of buoys to acetylene, which was in progress; the completion of the new concrete retaining wall at the south side of the reclaimed lands, and the repair of the damage caused by the storm last February.

The new works authorised were the completion of the North Quay extension and the extension of Alexandra Quay at a cost of £50,000. In conclusion, Mr. Baird said it was true that he had had rather an anxious time, but it had also been an exceptionally pleasant time, because from every member he had received nothing but kindness and help during his term of office.

The Port of London Authority

London's Shipping.

During the week ended December, 22nd, 826 vessels, representing 955,062 net register tons, used the Port of London. 432 vessels (760,630 net register tons) were to and from Empire and Foreign ports, and 394 vessels (194,462 net register tons) were engaged in coastwise traffic.

* * * *

During the week ended December 29th, 813 vessels, representing 936,459 net register tons, used the Port of London. 375 vessels (740,309 net register tons) were to and from Empire and Foreign ports, and 438 vessels (196,150 net register tons) were engaged in coastwise traffic.

Thirty-one laden vessels docked with 56,360 tons of softwood.

* * * *

During the week ended January 5th, 956 vessels, representing 904,528 net register tons, used the Port of London. 384 vessels (727,024 net register tons) were to and from Empire and Foreign ports, and 572 vessels (177,504 net register tons) were engaged in coastwise traffic.

Sixteen timber-laden vessels docked with 20,771 tons of softwood.

* * * *

During the week ended January 12th, 884 vessels, representing 1,000,097 net register tons, used the Port of London. 435 vessels (799,020 net register tons) were to and from Empire

and Foreign ports, and 449 vessels (201,077 net register tons) were engaged in coastwise traffic.

During the month of December, 37 vessels, totalling 373,474 gross register tons, used the Tilbury Passenger Landing Stage.

* * * *

During the week ended January 19th, 855 vessels, representing 980,626 net register tons, used the Port of London. 419 vessels (772,197 net register tons) were to and from Empire and Foreign Ports and 436 vessels (208,429 net register tons) were engaged in coastwise traffic.

The Westminster Dredging Co., Ltd.

Brig.-Gen. The Hon. C. G. Bruce, C.B., M.V.O., has joined the Board of the Westminster Dredging Co., Ltd.

Dredging Contract at Bromborough Dock.

The Westminster Dredging Co., Ltd., have been awarded a contract for twelve months by Messrs. Lever Bros., Ltd., for dredging the entrance to the Bromborough Dock on the River Mersey. Instead of the silt being dumped at sea outside the Mersey Bar, the dredgings will be dealt with by a special unit of dredging and reclamation plant and will be pumped ashore into certain areas adjoining the Bromborough Dock. When these areas have been filled, considerable acreages of land will be available for industrial purposes.

Construction of the World's Largest Ship Canal Elevator

This Article gives a condensed Review of the existing Ship Canal Elevators, particularly considering the World's Largest Ship Elevator now approaching completion in Germany

IT is about a hundred years ago since the first ship elevator in the World was built for the Grand Western Canal in England. In the years that followed this splendid feat of engineering, the march of progress in this field produced nothing very startling. The first intrinsically important step forward was made at the inception of the ship elevator plant at Niederfinow (Germany), now nearing completion.

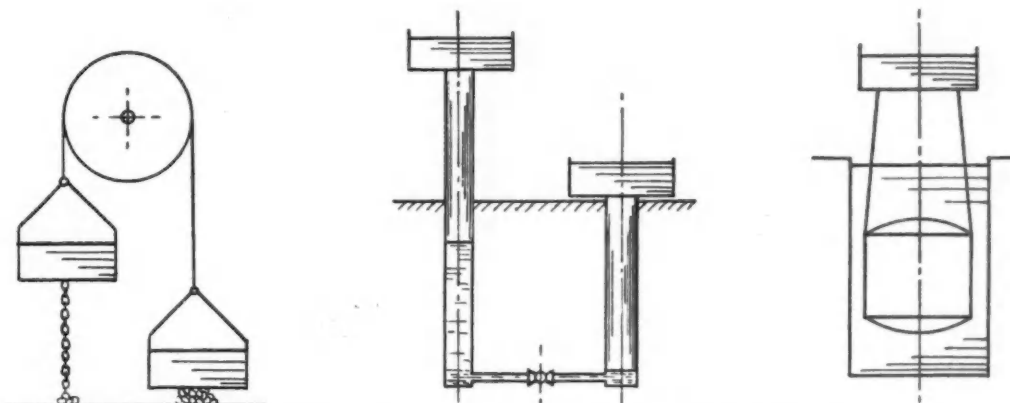
In view of this momentous event, it is proposed to give an outline of this gigantic piece of engineering work, as the novel manner in which the difficult problems were solved is of first-class importance to the engineering world at large.

The Hohenzollern Grand Ship Canal running from Berlin to Stettin and connecting the Havel and thus the Elbe with the Oder, has at one point—Niederfinow—to overcome a difference in level of 120 feet. The top reach of the Hohenzollern Canal therefore lies 120 feet above the bottom reach in the valley of the Alten Oder.

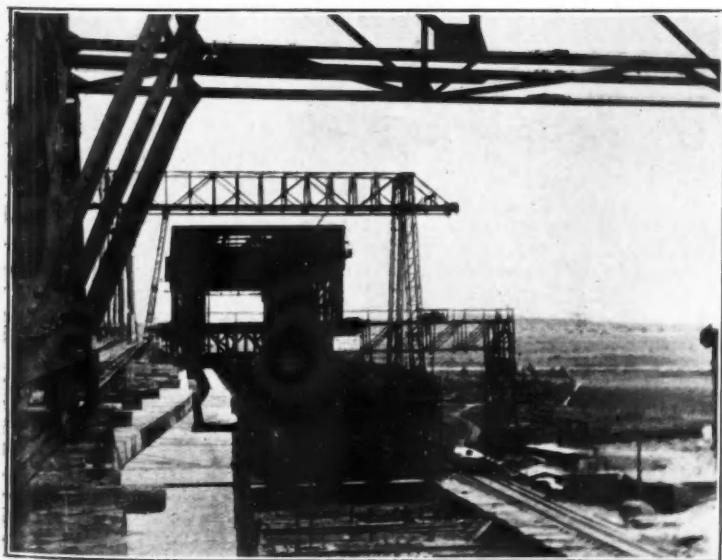
Until now, the difference of level has been overcome by a series of locks comprising four



View from the administration buildings.



Diagrammatic Representation of the different kinds of existing ship elevators in the world.



View of the semi-completed canal bridge and elevating plant from the top level.

compound locks, each having a head of 30 feet. As far back as 1905 this series of locks were to have been supplemented by a second arrangement for lifting and lowering ships. At that time, however, there was some doubt as to the type of construction which should be adapted.

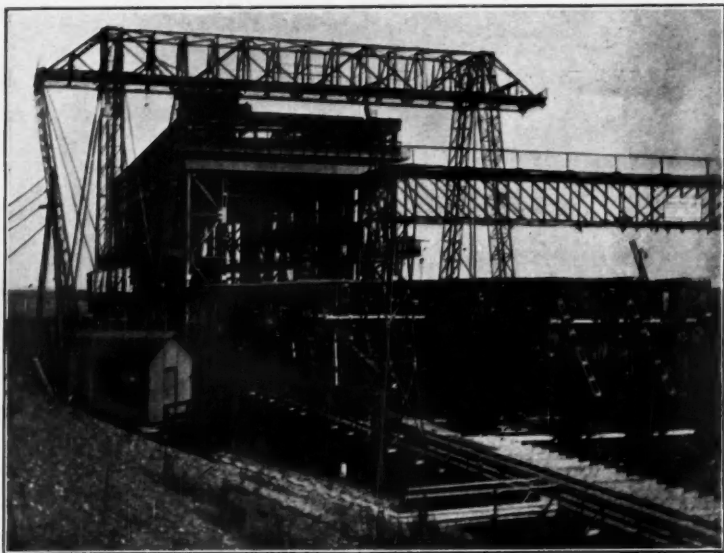
After many years of diligent study and investigation as to whether recourse should be had to locks, elevating plant, dry or wet conveyance, it was ultimately decided that under the prevailing conditions the soundest policy would be to erect a ship elevator, using the wet means of conveyance.

As the duties expected of the elevator were so stupendous that all previously erected constructions were useless as prototypes, the engineers were faced with entirely new problems.

The table on the next page compares the capacity of the existing elevators against that stipulated for the new elevator near Niederfinow.

At present there are 10 ship elevators in service—2 in England, 1 in France, 4 in Belgium, 2 in Canada and 1 in Germany.

Construction of the World's Largest Ship Canal Elevator—continued

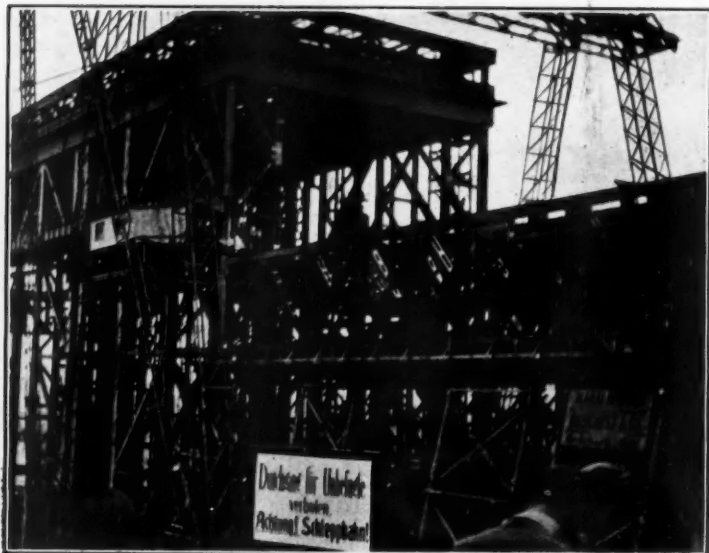


View of the two erection cranes for elevating plant and canal bridge.

Ship Elevator	Year of construction	Type of Construction	Weight of Trough (dock)		Lifting Height
			Tons	Ft.	
Grand Western Canal, England	1838	Chain with double trough			
Anderton, England	1875	Hydraulic piston double trough			
Anderton, England	1906	Ropes with counterweights			
Les Finettes, North France	1888	Hydraulic piston double trough	790	43	
Canal du Centre near La Louvière, Belgium	1888	Hydraulic piston double trough	785	51	
Four further elevators in the Canal du Centre	1917	Hydraulic piston double trough	1,570		
Trent Canal, near Peterborough	1903	Hydraulic piston double trough		65	
Kirkfield, Canada	1907	Hydraulic piston double trough			
Heinrichenburg Dortmund-Ems-Kanal	1893	Immersion cylinders	2,400	46	
Niederfinow Hohenzollern-Canal	Under construction	Ropes with counterweights	4,200	120	

It is evident from this table that the majority of the ship elevation plants which are at present in service, operate on the principle of the hydraulic balance (designated in the table as hydraulic piston).

It was initially deemed proper to adapt the principle of this system for the new construction, but it was very soon discovered to be impracticable for the prevailing duties; it is impossible to load one ram with about 4,200 tons. With two rams the danger of getting out of alignment would have been too great and the reliability inadequate, apart from the fact that the sinking of, and the laying of the foundations for, these pressure cylinders would have entailed enormous difficulties.



View from the administration buildings.

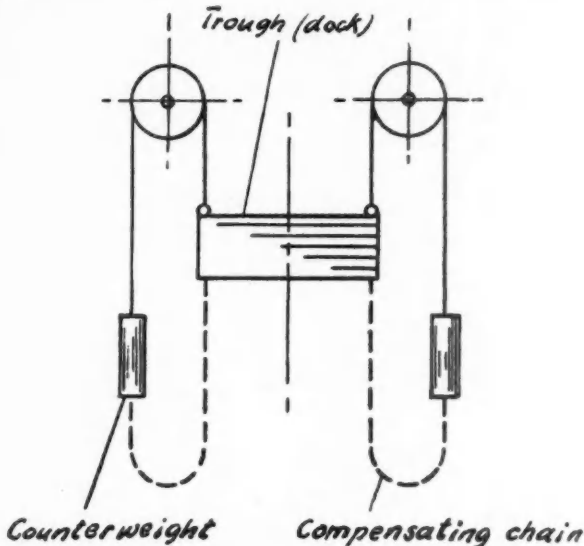
The Heinrichenburg plant was useless as a standard in view of foundation difficulties. The sinking of walls over 165-ft. deep (with Heinrichenburg they were 90-ft. deep in rocky ground) in such poor building ground as at Niederfinow would have solely been possible with the aid of the freezing process, which, however, involves enormous expense and yet fails to afford sufficient security. It was thus impossible from the outset to fall back upon any of the existing plants as a model.

The novel problems to be tackled thus gave birth to multifarious designs. Almost every one of the designs submitted during the competitions held in 1906 and 1912 had a fundamentally different way of solving the problem.

In this connection, cursory reference will only be made to two particularly interesting and novel ideas.

One was the drum-shaped ship elevator designed by Messrs. Maschinenfabrik Augsburg-Nürnberg. This comprised an enormous cylinder of 168-ft. diameter floating horizontally on the lower water level and containing inside two tubular-shaped troughs, or tunnels, for taking the ships. This arrangement was driven by pinions which turned the cylinder through an angle of 180 degs. when conveying the ships from one canal to the other.

The other design of note is the helical-shaped tower of Messrs. Gute Hoffnungshütte. This tower contained helical-shaped rail tracks on which the trough carriage moved up and down.



From the experience amassed in the course of years there ensued in 1926 a design evolved by the Reichswasserstrassen-Verwaltung which was finally accepted for the construction of the Niederfinow ship elevator. An important component part of this design is the invention by Oberbaurat Loebel as briefly characterised below.

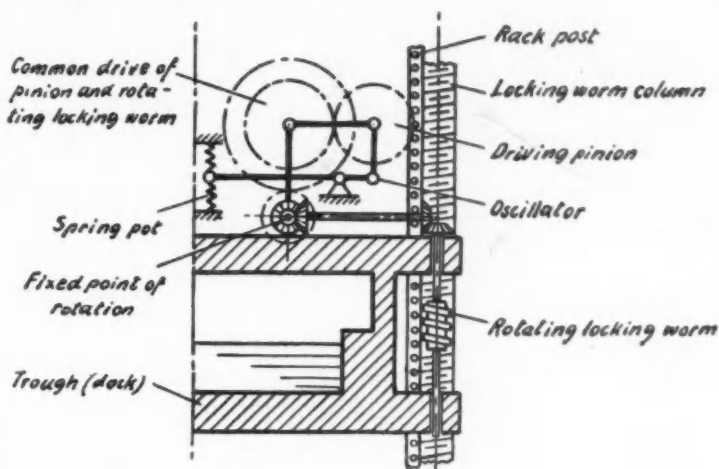
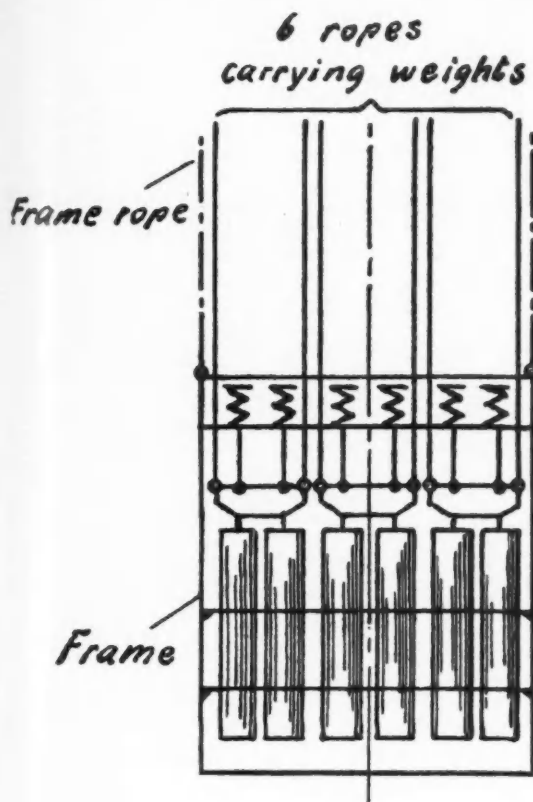
This principle is: wire rope suspension of the ship's trough (wet conveyance) and weight compensation by counterweights.

The 4,200-ton trough (1,600 tons dead weight + 2,600 tons water load=4,200 tons), is suspended on 256 wire ropes which run over 128 rope wheels of 11.5-ft. diameter. Therefore, two cables run in common over a rope wheel, the lay of these cables being towards the right and the other towards the left in order to equalise the twist. Eight ropes are combined to one group. Six ropes carry the counterweights direct; the remaining two support a frame which intercepts the counterweight if the rope breaks and simultaneously acts as a guidance for the sheaf of weights in the framework.

The weight of the unwinding cables must be compensated as otherwise starting as well as braking of the trough would become unnecessarily difficult. Compensation is thus produced by four revolving chains, which have the same weight as the ropes. The bearings of the 128 rope wheels together transmit to the structure a load of twice the weight of the trough, i.e., trough weight=weight of the counterweights=twice 4,200 tons=8,400 tons.

From the aspect of statics the structure represents a double-jointed frame. Lateral strengthening struts are also provided on the middle part of the

Construction of the World's Largest Ship Canal Elevator—continued



This astonishingly small output is only possible owing to the perfect weight compensation. It would, in fact, have been possible to set the ship elevator into motion by solely reducing or increasing the weights and merely using the motors as regulating organs, because an increase in water level in the trough of 1 cm. denotes a load of 10 tons, which the frictional resistances could easily overcome.

Drive and Safety Devices according to Loebel.

The trough must be safeguarded against two contingencies:

- (1) Emptying of the trough;
- (2) Breaking off of the counterweights.

In both cases this is assured by a short stout locking spindle or worm which travels, with a play of $1\frac{1}{4}$ inches through a long "slit nut," and which merely engages with the nut in one of the above mentioned instances.

The motors drive through gearing on to four pinions which mesh with the rack posts and so set the trough into motion. The pinions are supported in a resilient manner and thus enable the rotating locking worm (short locking spindle) to engage. The pinion drive must naturally be positively connected with the rotating locking worm. The "slit nut" will be termed the locking worm column in the following.

The action of the locking mechanism in the event of an accident is as follows:—

Let us assume that the trough has been so severely damaged by an accident, such as the bursting of a lifting gate, that it is emptied within a short time. How can this be counteracted? The weight of the trough is decreasing every second and the counter-weights tend to tug it upwards. The pressure on the teeth of the driving pinion increases and ultimately exceeds the maximum admissible limit. Consequently, the

so-called central tower which carries the rack posts and the locking device. The east tower (on the side of the lower reach) has a buffer beam at the level of the top reach as a safeguard against the impact of ships. The west tower takes care of the longitudinal guidance of the trough. It is supported in a stable manner and is not rigidly connected with the central tower. The longitudinal forces are so equalized in it and conducted into the ground as not to impose a load on the remaining structure.

The trough, or dock, consists of a sheet metal tank which is riveted in a lattice-work construction. Its two ends are closed off by lifting gates similar to the conventional type.

The Drive.

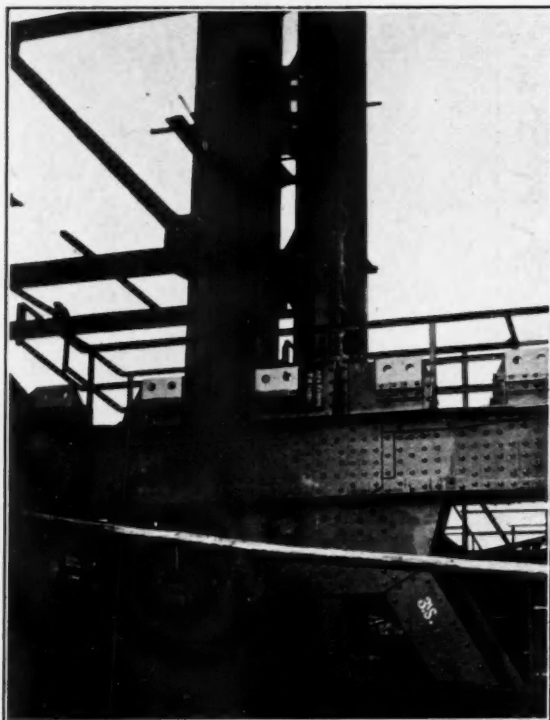
The driving machines are four 75 h.p. d.c. motors mechanically connected together with a shafting. It was found to be necessary to adopt this arrangement in order to prevent the trough from getting out of alignment should any one of the motors lead or lag the others.



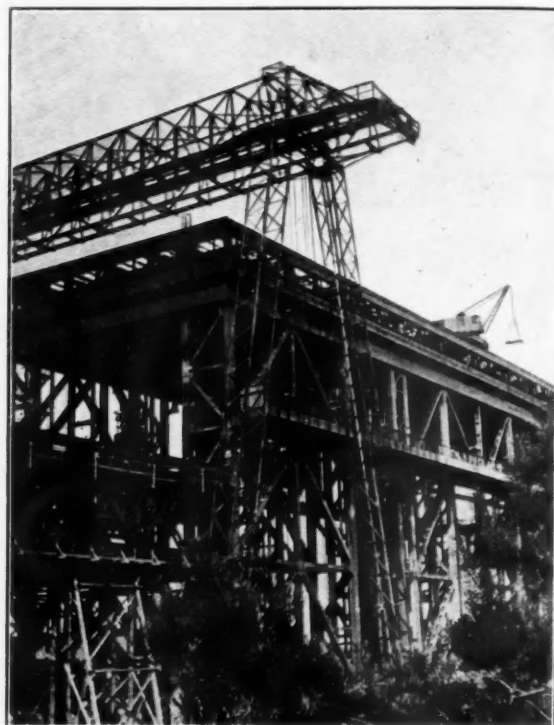
View of the construction from the lower level.



Locking worm column.

Construction of the World's Largest Ship Canal Elevator—continued

Locking worm column, rack post, connecting points for the ropes on the trough beams.



View from the administration buildings.

oscillator on which the pinion is supported compresses the springs of the spring pots and during this movement simultaneously actuates the controllers of the motors. The mechanism comes to rest and the rotating locking worm gradually engages with the threads of the worm column.

If the motor controllers were to fail, the worm would definitely engage and turn on the column. In this case, the current consumption of the motors would be so heavy, due to the great friction so that all the fuses would blow and stop the motors.

The trough is kept tight during the entrance and exit of ships by an U-shaped frame which is pressed against the shield-like ends of the trough. This frame is moved and pressed through eccentrics by two electric motors with worm gearing. This method of tightening has already proved a success on the working model. The space between the trough and levels is 2—5-ft., contingent upon the temperature.

The elevator is now practically completed. At the moment, the canal bridge is being connected up. The piers of the canal bridge are set in foundations which are not vertical, but sunk

into the ground slightly inclined towards the banks. In this way, it was possible to minimize the dimensions of the foundations, as the resultant pressure of the dead load (canal bridge) and earth is now perpendicular to the base of the foundations. The latter incorporate pressure gauges which electrically indicate the load increment during building operations.

A gigantic erection crane which spans the 160-ft. high structure travels over the whole. The framework is completed and ready to take up the enormous load. The central tower has already been furnished with the huge worm columns, which are secured by heavy bolts to the framework. The great accuracy of the arrangement has already been substantiated by the fact that a worm has travelled the whole length of the column without touching it. The "threads" of the columns are milled out of cast steel. The individual parts of the columns can be adjusted by a special device so that subsequent displacements can be compensated.

(concluded on page 130)



View of the interior of the gigantic steel structure.



View of the trough during erection.

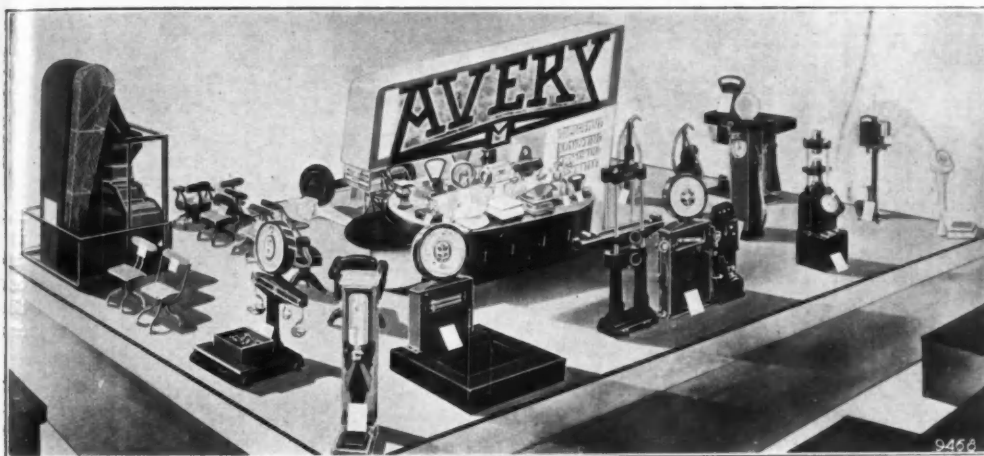
British Industries Fair

Some Exhibits at the Castle Bromwich, Birmingham Section, February 19—March 2, 1934

W. & T. AVERY, LTD. (Birmingham).

In the Engineering Group, W. & T. Avery, Ltd., of Birmingham (Stand No. F333, Castle Bromwich Section) have considerably extended the range of their exhibits, for on an island site in a central position they have included, besides the latest of the weighing, counting and testing machinery for which they are famed all over the world, a greater selection from the various types of petrol meter pumps they manufacture, and almost a complete range of scientific seating for executives and office and factory workers, marketed by an associated company—The Tan-Sad Chair Co. (1931), Ltd.

In the field of weighing machines, notable exhibits include the new wheel weigher for the use of local authorities for the administration of the Road Act (1930); a remarkable new counting machine for handling repetition work; and (as a working exhibit) an automatic weigher for continuously weighing any dry free running material flowing by gravity.



Messrs. W. & T. Avery's Exhibit.

Among the testing machines there is real advancement shown in the design of a new transportable self-indicating universal machine of 5 tons capacity. The machine in question has never before been exhibited, and it will appeal specially to small manufacturers who have hitherto found it uneconomical to install one of the larger machines which alone were available until the advent of this new model.

An equivalent testing machine for higher capacities is also exhibited, and the use of both will be demonstrated upon request.

The two self-indicating counting machines demonstrated on the stand will be of particular interest to makers of repetition work, and to those responsible for efficient storekeeping and stocktaking. Members of the textile industry should make a point of seeing the nett spool weigher.

No one will pass by the Avery stand without weighing themselves on one of the new personal weighing machines conveniently placed at each corner.

THE PORT OF BRISTOL AUTHORITY.

The Port of Bristol Authority, embracing docks at Bristol, Avonmouth and Portishead will be again represented at this year's Castle Bromwich section of the British Industries Fair. Arrangements are in hand to display, among other attractive features, a scale model of the Avonmouth Docks. There will be shown also the Port film, a first-class production, which illustrates in a most convincing manner the wide scope of the Port's activities. Despite the general trade depression, the returns for the Port of Bristol during the last year or so have actually created records, both in the quantity of goods imported and in the net register tonnage accommodated.

CELLACTITE & BRITISH URALITE, LTD.

(Lincoln House, 296-302, High Holborn, W.C.1.)

Cellactite & British Uralite, Ltd., are exhibiting at the Castle Bromwich Section of the British Industries Fair, and will be featuring Urastone pipes and Cellactite roofing, particularly the new Cellactite "Medway" Ventilator which is an efficient roofing accessory especially suited for use in conditions where corrosive fumes are present.

The Cellactite "Medway" Ventilator is an efficient roof vent designed (a) to keep out weather and down-blow; (b) not

merely to offer minimum obstruction to the natural flow of warm air, but actually to induce upward pull.

Whatever form of ventilation is chosen, its operation will be largely dependent on the following factors:—

- (1) Height of ventilator above air intake.
- (2) Minimum cross section of air stream in ventilator.
- (3) Temperature difference of air inside and outside the building.
- (4) Wind velocity.

RUSTON-BUCYRUS, LTD., (Lincoln). Stand F.130, and also Quarry to Roads Section.

Ruston-Bucyrus, Ltd., of Lincoln, the well-known excavator makers, will have at the British Industries Fair at Birmingham an exhibit of unusual interest. It will introduce to the public an excavator of a new size and of distinctive design, known as the Model 10-RB. This machine is of the universal type with numerous alternative digging equipments, each with a bucket of $3/8$ cubic yard capacity. Two of these machines will be on view, one with shovel equipment upon the Stand inside the Hall, the other working outside as a dragline excavator.

Because of its many new practical features the Model 10-RB is certain to create a sensation in the Excavator world, and everyone interested in a small excavator should make a special point of inspecting these two examples of it. None of the Ruston-Bucyrus standards of reliability have been sacrificed in

its design and construction, but unusually light weight and low-selling price have been combined with high power, rugged strength, fast operation and remarkable working ranges for a machine of its weight.

The working weight is less than seven tons, and the bearing pressure upon the ground is unusually low—about 8 lbs. per square inch with standard tracks and less than 6 lbs. per square inch with the special tracks that can be supplied for use on very soft ground. The power and stability of this new machine may be judged by the fact that it is equipped with a petrol-paraffin engine of 30-25 h.p., and that, equipped as a crane, its safe load rating is 6,100 lbs. at a radius of 10-ft. or 1,600 lbs. at 23-ft. radius. Extraordinary mobility is another important characteristic. On good ground a travelling speed of $2\frac{1}{2}$ miles per hour is obtainable. On bad ground, under working conditions, the normal travelling speed is slightly less than one mile per hour.

The unusual combination of light weight and mobility with power, stability and strength of structure has been obtained primarily by substantial improvements in fundamental design, careful but progressive application of modern welded construction and more extensive use of special alloy steels.

Complete catalogues, specifications and illustrations of this very interesting new excavator will be available at Stand No. F.130 in the Exhibition Building, where all visitors will be made welcome by the engineers in attendance. After February 19th full particulars will also be obtainable, upon request, from Messrs. Ruston-Bucyrus Limited, Excavator Works, Lincoln.

THE WHITE CROSS COMPANY, LTD. (Warrington).

The exhibit this year is intended to convey the wide range of their manufactures, which in addition to the standard wire lines, such as wire netting, barbed wire and fencing wire, includes many specialities, a few of which are as follows:—

Steel strip, non-ferrous conductors of copper and aluminium, etc., including segmental wire for overhead work; also special high strain steel wire for springs and other purposes.

Galvanized wire as shown on the Stand will be manufactured as usual from their well-known Whitecross "Silflex" brand material, which will not flake or peel even when wrapped on its own diameter.

British Industries Fair—continued

There will be a demonstration of the actual drawing of wire on the Stand, also a special showcase demonstrating the evolution of wire ropes from raw material in the bloom form through the various stages of manufacture to the finished wire rope in standard constructions or in special locked coil constructions or flattened strand constructions for special purposes.

GENT & CO., LTD. (Faraday Works, Leicester).

Messrs. Gent & Co., Ltd., will be showing "**Pul-Syn-Etic**" **Electric Clocks**, including:—A "**Pul-Syn-Etic**" Time Transmitter controlling the clocks on the Stand, also approximately 60 clocks in the Exhibition, operated by an Exide sealed accumulator trickle charged from the A.C. Mains, and so not affected by any stoppage of Mains current. A "**Pul-Syn-Etic**" Sub-Transmitter fitted with Relay "**Reflex**" Pendulum Control operated from Prime Transmitter for use in buildings which are separate from the main building, and overhead wires are used, so that if wires are carried away, Time Transmitters continue to operate. A "**Pul-Syn-Etic**" Electric Turret Clock operated by a "**Waiting-Train**" movement, which is controlled by the Time Transmitter on the Stand. Electric Hourly-

striking Gear, total weight of bell, 5-cwt. (made by Taylor's, of Loughborough), and controlled by the "**Pul-Syn-Etic**" Time Transmitter on the Stand. "**Pul-Syn-Etic**" Electric Impulse Marine Type Time Transmitter fitted with advance or retard apparatus for use on ships, together with Marine Clocks.

"**Tangent**" **Mining Apparatus**.

"**Tangent**" **Liquid Level Indicating, Recording and Alarm Apparatus**.—Electrical Transmitter and Recorders for remote operating. Suitable for reservoirs, tanks, gasholders and the like. Single or double line working and battery or A.C. current. Sewage Indicators, "high" and "low" alarm devices, and automatic pump control.

"**Tangent**" **Luminous Call Systems**.

Telephones.

Process Timing, Idle Machine and Output Recorders.

"**Tangent**" **Sound Signals and Signalling Devices**.

"**Tangent**" **Watchman's Clocks**.

"**Tangent**" **Relays**.—Relays of all classes, low and high voltage, large and small currents. Main Switch, Relay-operated from a distance, double or triple pole, 500 volts up to 50 amperes.

"**Tangent**" **Fire Alarm Apparatus**.

Cowes Harbour Commissioners: Proposed Training Bank and Dredging

1.—The Commissioners are proposing to proceed with a comprehensive scheme for preserving the Deep Water Channel through Cowes Harbour and think it desirable that their proposals and the circumstances which have led up to them should be well known to those who have an interest in the Harbour and the Shipping to and from the Island as a whole.

2.—It must be remembered that Cowes is the Port of the Isle of Wight and the only place where large ships can discharge and load, and consequently it is considered to be of the utmost importance that a sufficient depth of water should be maintained to give the facilities required for a convenient port.

3.—The Commissioners were brought into existence by the Cowes Harbour Act 1897 for the special purpose of improving and efficiently maintaining the Harbour, and it is to be borne in mind that they are not allowed to make a profit but must expend their surplus revenue on necessary Harbour Works.

4.—When the Act of 1897 was passed circumstances were very different from what they are now and as a result the dues allowed by that Act were unusually low. At that time the Admiralty expended annually a very large sum of money on dredging the main channel of the River to maintain a proper depth of water to allow the Royal Yachts and Admiralty Vessels to come in and out from the Trinity Wharf, East Cowes, at all states of tide, in addition the Admiralty provided, maintained and lighted the Harbour fairway buoys. Admiralty dredging went on until about 1905 and until then the Commissioners were saved a large expenditure. About 1925 the Admiralty discontinued the buoying and lighting of the Harbour and the whole cost of the same was thrown on the Commissioners.

5.—These changes in Admiralty procedure have had a most serious effect on the Finances of the Commissioners and have now resulted in their inability, through lack of funds, to maintain a proper depth of water in the Main Channel.

6.—In ten years over £11,000 has been spent in dredging this Channel and 109,000 cubic yards have been removed from the River Bed, but with the silting at a rate of about one foot per annum the Main Channel cannot be properly maintained and at the present time the position is very serious.

7.—The alteration of the Shrape has undoubtedly had a considerable effect on the Bed of the River at the Harbour mouth. In the last 80 years what might be called the toe of the Shrape has receded 600 feet and the loss of height in some places is over six feet, with the result that the natural break-water formed by the Shrape is losing its value and the West Cowes Channel is being gradually replaced by a new channel which is forming between the East side of the Gravel Bank and the West margin of the Shrape.

8.—The Commissioners have obtained advice from Messrs. Sir John Wolfe Barry and Partners, who are the leading engineers in this class of work, and that firm has made full investigation into the circumstances and furnished a comprehensive report and proposals for the remedial work to be undertaken.

Their proposals, which are unanimously approved by the Commissioners, are shortly as follows:—

(a) That a Training Bank should be constructed in order to turn the ebb current after it leaves the narrows into the

West Cowes Channel.

(b) This to be a Rubble Bank up to low water level and a groyne of reinforced concrete "A" frames faced with timber sheeting built upwards above high water with dolphin piles at each end. The cost of this being estimated at £16,100 which includes an Apron between the end of the Training Bank and the East Cowes Foreshore to prevent excessive scour over this area.

(c) That dredging be carried out to the West of the Training Bank to give 10 feet of water at L.W.O.S.T. in the Main Channel and further dredging be done to the South of the Pontoon at the estimated cost of £6,435.

(d) Total cost £22,535.

9.—The Commissioners are advised that the construction of the Training Works should prevent a deterioration of the West Cowes Channel and arrest the formation of the new channel referred to above. At the same time by increasing the scour in the West Cowes Channel they would also increase the ability of the Channel to keep itself clear of silt and so reduce the dredging.

10.—The Finances of the Commissioners are such that they would not only probably be unable to raise the necessary loan but they are quite unable to meet the annual principal and interest instalments on such a capital sum which it is assumed would be approximately £1,250 for a period of thirty years.

11.—The Commissioners' Gross Revenue (excluding investments) in the year ending the 31st March, 1933, amounted to £1,662 16s. 0d. including dues from:—

	£	s.	d.
Merchant Shipping	504	15	9
Passenger Vessels and Tugs	274	12	3
Yacht Charges for Moorings and Berths	498	11	0
Merchant Shipping Charges for ditto	30	8	0
	£1,308	7	0

12.—It is anticipated that without the annual cost of dredging the Commissioners should be able to find about £700 per annum towards this sum and they now desire to obtain Financial Assistance from outside to enable them to carry out this work which they consider essential for the Trade and Industry of the whole Island.

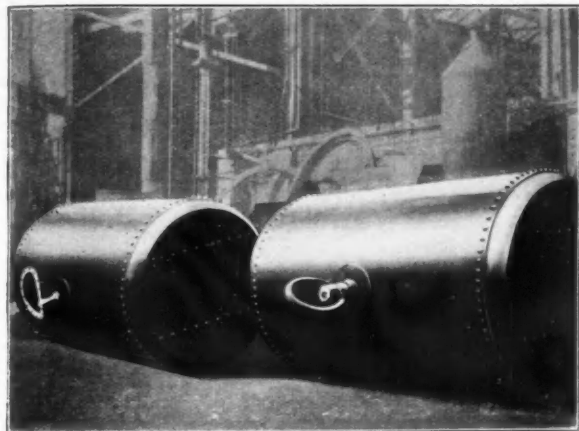
13.—It is of interest to note that nearly all the coal for the Isle of Wight comes through Cowes Harbour and that the import for the past twelve months amounted to over 156,000 tons, and the various imports to Newport Quay which are free of Cowes Harbour dues were 117,851 tons.

14.—From an analysis of the receipts from traffic it will be found that shipping to the Southern Railway Wharf paid £331 6s. 6d. for the year ended the 31st March, 1933, and other shipping to the Port £470 17s. 0d.

15.—If Financial Assistance is not forthcoming to enable the proposed Works to be carried out the result will be the gradual silting up of the Harbour Mouth and consequently most serious loss to the Trade and Commerce of the Isle of Wight.

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Cylindrical Mooring Buoys, 4' diameter.

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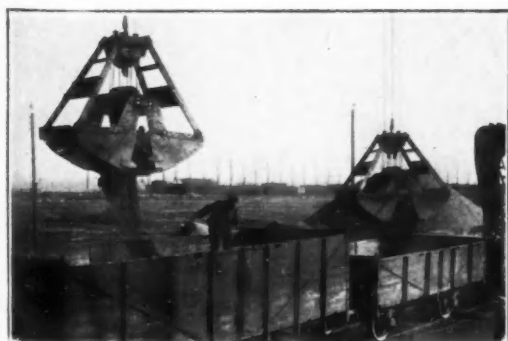
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United States Ports Statistics*

Vessel Movements in Foreign Trade at the Port of New York.

Entrances and clearances of vessels in foreign trade at the Port of New York in November, 1933, were 380 and 418 respectively, and were greater than that in the same period last year by 5 and 9 per cent.

	November		Net Change	
	1933	1932	Amount	Per Cent.
Entrances, No. of Vessels ...	380	362	+18	+5.0
Clearances, No. of Vessels ...	418	389	+35	+9.1
Entrances, Net Reg. Tonnage	1,776,664	1,755,745	+20,919	+1.2
Clearances, Net Reg. Tonnage	1,966,079	1,827,016	+139,063	+7.6

The continued gain in the last few months of the number of vessels moving in foreign trade at the Port of New York as compared to last year, will bring the total for the year 1933 very nearly up to the level of 1932. For the eleven months, January to November, entrances and clearances are only 5 and 4 per cent. respectively behind the same period in 1932.

	January—November		Net Change	
	1933	1932	Amount	Per Cent.
Entrances, No. of Vessels ...	4,487	4,743	-256	-5.4
Clearances, No. of Vessels ...	4,676	4,863	-187	-3.8
Entrances, Net Reg. Tonnage	23,530,365	24,777,102	-1,246,737	-5.0
Clearances, Net Reg. Tonnage	24,075,680	24,923,733	-848,053	-3.4

Value of Foreign Trade at the Port of Boston, Mass.

Foreign trade at the Port of Boston is on a decided upswing, having gained 73 per cent. in October, 1933, as compared with that month last year. Exports amounted to \$1,169,696 as against \$1,099,487 last year, a gain of 6 per cent., but imports were \$10,281,491 in comparison with \$5,522,203 in October, 1932, a gain of 73 per cent.

	October		Net Change	
	1933	1932	Amount	Per Cent.
Exports ...	1,169,696	1,099,487	+70,209	+6.4
Imports ...	10,281,491	5,522,203	+4,759,288	+86.2
Exports and Imports	11,451,187	6,621,690	+4,829,497	+72.9

An analysis of the important figures shows large increases in receipts of raw materials such as hides and skins, which increased in value from \$321,101 to \$1,251,056; raw wool, from \$83,162 in October last year to \$1,226,320 this year; raw cotton, from \$135,479 to \$482,364; and rubber and manufactures from \$214,711 to \$554,514, all of which reflects an increased industrial activity in the district served by this port.

Vessel Movements in Foreign Trade at Boston, Mass.

Vessel entrances and clearances in foreign trade at Boston in November, 1933, were greater than last year. Entrances numbered 124 vessels as against 117 vessels in November, 1932, a gain of 6 per cent., while clearances were 128 as compared with 120 last year, a gain of 7 per cent.

	November		Net Change	
	1933	1932	Amount	Per Cent.
Entrances, No. of Vessels ...	124	117	+7	+6.0
Clearances, No. of Vessels ...	128	120	+8	+6.7
Entrances, Net Reg. Tonnage	493,223	460,035	+33,188	+7.2
Clearances, Net Reg. Tonnage	496,513	475,459	+21,054	+4.4

Cumulative data for the eleven months, January to November, 1933, show that the number of vessels entered and cleared at Boston exceeded that of the same period last year. While the percentage increase in the number of vessels is small, the much greater increase in net register tonnage indicates that larger vessels used this port this year as compared with 1932.

	January—November		Net Change	
	1933	1932	Amount	Per Cent.
Entrances, No. of Vessels ...	1,547	1,543	+4	+0.3
Clearances, No. of Vessels ...	1,556	1,553	+3	+0.2
Entrances, Net Reg. Tonnage	5,803,107	4,634,326	+1,168,781	+25.2
Clearances, Net Reg. Tonnage	5,920,603	4,639,195	+1,281,408	+27.6

Value of Foreign Trade at Philadelphia, Pa.

An analysis of the foreign trade figures of the United States Department of Commerce for the month of October, 1933, shows that the value of exports and imports at Philadelphia in that month amounted to \$14,264,249 as compared with \$9,954,319 in October, 1932, a gain of 43 per cent. Exports gained 24 per cent., and imports 54 per cent.

	October		Net Change	
	1933	1932	Amount	Per Cent.
Exports ...	4,449,691	3,599,618	+850,073	+23.6
Imports ...	9,814,558	6,354,701	+3,459,857	+54.4
Exports and Imports	14,264,249	9,954,319	+4,309,930	+43.3

Vessel Movements in Foreign Trade at Philadelphia, Pa.

Entrances and clearances of vessels in foreign trade at Philadelphia in November, 1933, were 1 and 10 per cent. respectively higher than last year.

* Reproduced by kind permission of "Shipping Register and World Ports," Montreal and New York.

	November		Net Change	
	1933	1932	Amount	Per Cent.
Entrances, No. of Vessels ...	121	120	+1	+0.8
Clearances, No. of Vessels ...	122	111	+11	+9.9
Entrances, Net Reg. Tonnage	634,307	612,448	+21,859	+3.6
Clearances, Net Reg. Tonnage	651,745	591,024	+60,721	+10.3

The number of vessels entered and cleared in the 11 months, January to November, was 1,506 and 1,480, being an increase over the same period last year of 11 and 19 per cent. respectively.

	January—November		Net Change	
	1933	1932	Amount	Per Cent.
Entrances, No. of Vessels ...	1,506	1,357	+149	+11.0
Clearances, No. of Vessels ...	1,480	1,246	+234	+18.8
Entrances, Net Reg. Tonnage	7,713,996	7,015,144	+698,852	+10.0
Clearances, Net Reg. Tonnage	7,731,132	6,437,362	+1,293,770	+20.1

Multi-Bucket Excavators

Messrs. Stothert & Pitt, Ltd., Engineers, Bath, have recently issued a new publication describing Multi-Bucket Excavators.

The publication is exceptionally well produced, and includes some very good illustrations depicting the various uses to which multi-bucket excavators can be applied. There are also a number of diagrams included in the publication, which show many of the duties which these multi-bucket excavators carry out.

These excavators can be utilised for the excavation of gravel, sand, clay, chalk, earth, etc., and the operation of the machines is very simple, one man being able to handle the smaller sizes, while one or two additional men are required for the satisfactory working of the larger machines.

Messrs. Stothert & Pitt, Ltd., will be pleased to forward to any of our readers a copy of this publication upon request, if they will mention this journal.

Construction of the World's Largest Ship Canal Elevator

(concluded from page 126)

Temperature fluctuations due to the rays of the sun, etc., present great difficulties owing to the tremendous dimensions of the construction.



Counterweight lying on the building site.

It has been estimated that on imposing the continuous load, the entire steel structure will be compressed together to the extent of 6-in. The load will naturally be increased gradually; first of all, for instance, only the empty trough will be suspended and then slowly filled with water.

The wire ropes on which, so to say, everything hangs, must remain as homogeneous as possible and must not stretch themselves differently. This has been ensured on a special machine prior to their installation.